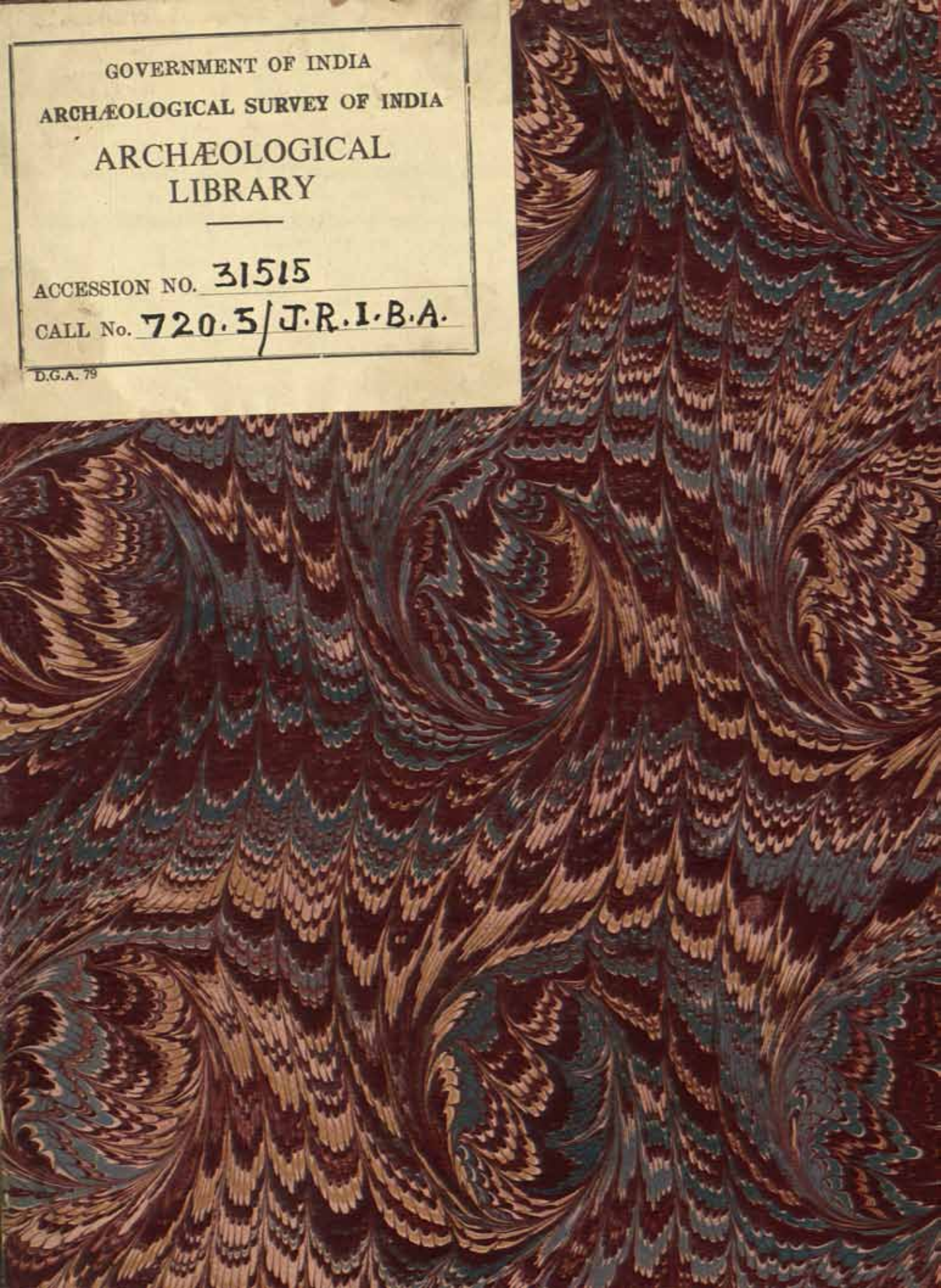


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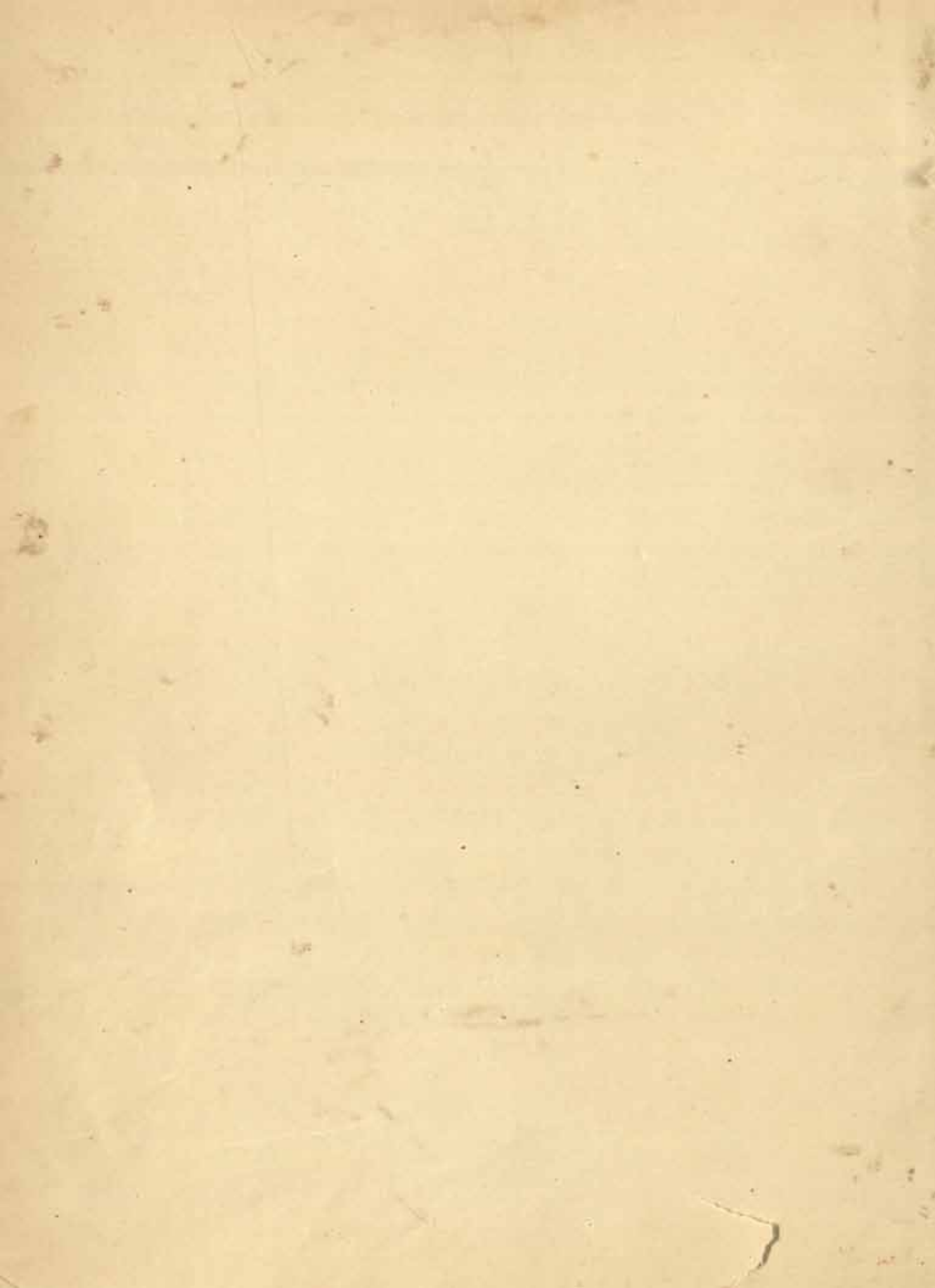
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JOURNAL

OF

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

Sixty-ninth Session — 1903-1904.

THE OPENING ADDRESS. Delivered by the President, Mr. ASTON WEBB, R.A. (elect),
F.S.A., at the First General Meeting, Monday, 2nd November 1903.

COLLEAGUES, LADIES, AND GENTLEMEN,—

FOR a second time it is my privilege as President to address you on matters of interest and importance in connection with Architecture and this Institute. But first permit me to express a hope that all present have been able to take, since we last met, some change of air and scene so necessary for the due performance of our work.

During the last twelve months there has not perhaps been any very striking development to chronicle. Our work is of such a character that twelve months is but a short period. Still, events have occurred which may have far-reaching effects in the future, as regards both our Art and this Institute, and it will be my duty to refer to some of them in my address this evening.

As regards our membership, 97 new members have been elected during the year, and we have lost 53 by death or resignation. Of our new members, 26 are Fellows and 71 Associates, and, in addition, 13 Associates have been elected to the rank of Fellow. All this is satisfactory, as far as it goes, but you will all agree with me that it does not go nearly far enough; we must not be content until the Institute includes among its members all reputable practising architects, or, at any rate, until we are satisfied that we have thoroughly investigated and removed as far as is possible all reasons for this not being so.

One matter concerning the affairs of the Institute, which I feel must shortly be dealt with, is the question of the election of Fellows, which, under existing rules, can hardly be said to meet the views of anybody. It is not very satisfactory to the Fellows on account of its indefiniteness and uncertainty; and it is even less so, I have reason to believe, to Associates, who, not unnaturally, object to find admission to Fellowship less difficult than entrance to Associateship. And yet it is by no means easy to devise a remedy for this state of things. It is easy to say that everyone wishing to join the Institute must do so as an Associate, but under our Charter everyone desirous of becoming an Associate must first pass an examination, but there are, admittedly, many whom we should like to join us, who, from their age, or standing, or want of leisure, could hardly be asked to submit themselves to the examination qualifying for Associateship.

How is this difficulty to be overcome? The only way that occurs to me is to do as was done in the case of Associates; and fix a date, say four or five years hence, after which, except in very exceptional circumstances, entrance to Fellowship otherwise than through the Associateship is absolutely closed. The fact that this would make the Fellowship somewhat more difficult to attain would increase its value in the eyes of the profession and the public, and would, in my opinion, rather attract than discourage membership. It was distinctly so in the case of the Associateship, and I believe would prove to be the same in the higher grade.

But, if this were done, it would be necessary, during the intervening period, to open the doors to the Fellowship wider than at present, so that no reputable practising architect desiring to join us should be debarred from doing so.

This is a question for the members of the Institute themselves to settle, and the Council, I am sure, would be glad to hear a full expression of opinion on a subject that must affect the future welfare of the Institute. I hope that an evening may be found during the Session when this matter may be fully discussed.

One event of last Session, that I hope may lead to good results, was the meeting of the Presidents of the Allied Societies on the day after our Annual Dinner, when, together with our Vice-Presidents, Past-Presidents, and myself, we informally discussed matters of interest, amongst these being the facilities for architectural education at present available in the various centres (especially in regard to the establishment of day schools); the question of the compulsory registration of architects; the admission to Fellowship of Presidents of Allied Societies, and of members unanimously proposed by an Allied Society. No resolutions were moved, but valuable information was exchanged.

Another interesting event was the visit of Mr. C. F. McKim, of New York, to receive the Royal Gold Medal. Mr. McKim brought with him a large number of illustrations of the work of himself and his colleagues, and has left behind him, I am sure, an enhanced opinion of the progress of architecture in America at its best, and a pleasant reminder of the public spirit which is alive in that great country to ensure the beautifying and ennoblement of her cities. May I also add that Mr. McKim has left amongst those he met a very high appreciation of the man himself, his personality, and a desire to see him some day again amongst us?

I have to thank you for the encouragement you gave, by your presence in goodly numbers, to my experiment of informal "At Homes." They afforded us an opportunity of seeing for the first time a large number of the working drawings, sketches, and designs of two very distinguished architects, John Francis Bentley and William Eden Nesfield (which could only be shown in some such informal way), and at the same time of bringing many professional friends together for a short time in friendly intercourse; and they have not, therefore, I hope, ended altogether in smoke! I propose to continue the experiment this Session, and trust you will again contribute to their success by your presence. One evening I hope to have the drawings of another eminent architect, the late John Loughborough Pearson, through the kindness of his son, Mr. Frank Pearson; and it has occurred to me that the exhibition, on another evening, of the water-colour sketches made by ourselves during our holidays might be of interest—painters of course being excluded on that occasion!

Another event in which this Institute has taken a keen interest is the acquisition of a permanent home by the Architectural Association.

It is a striking testimony to the high appreciation in which the work done by the Architectural Association is held that the Architectural Museum buildings and their contents should have been handed over to the Association as a free gift by the unanimous wish of the subscribers to the Museum, accompanied, I believe, by the full approval of all members of the profession.

But the Association have a serious work in hand to adapt the premises to their present and future requirements, involving them in an outlay far beyond the means at present at their disposal. Your Council felt sure they were interpreting your desire to show the interest of the Institute in the work, and have voted a sum of £500 towards the building fund.

The day-school so successfully started by the Association seems destined in its new premises to work almost a revolution in our architectural education (or want of it); but as I went through the spacious courts of the *École des Beaux Arts*, the other day, with their full-size models of columns and entablatures, together with examples of Renaissance and Mediæval work, I said to myself the Architectural Association are only at the commencement of their work; they cannot stop, but must go on, and when they have completed their schools must complete and extend their museum, and we older architects must take care to see them through with it. It has been a pleasure to the Institute for many years to lend this room to the Association for their meetings, and we shall miss them when they go; but we hope often to have their presence amongst us, for we need the energy and initiative of the younger men.

In this connection I may briefly refer to the question of our own premises, mentioned in my last address. I then ventured to express my own opinion that this question of premises, though very important, could hardly be considered an immediately pressing one; and the question of a joint building has now been solved by the gift of premises to the Association. At the same time your Council and officers have not lost sight of the matter, and it is possible they may have some proposals to lay before you in connection with this subject later in the Session.

Another event must be noted, *i.e.* the adoption and issue of a Form of Conditions of Contract, which has been accepted by both the Institute of Builders and ourselves. (It is some indication of the importance of this document, and the complicated nature of some of an architect's work outside his art, that it has taken some eight years to arrive at this result.) This contract, while recognising the absolute authority of the architect over the workmanship and materials used on the works, has defined, as far as is possible, the relative responsibilities and duties of the client, the architect, and the contractor; and though it is, of course, too much to expect that any document could be drawn that would meet every case that may arise, we believe it will be found of great use to all engaged in building operations.

The last Council election was made the occasion of bringing before us again very prominently the question of the compulsory registration of architects, a subject which also made its appearance in the columns of the *Times* and in the list of Bills which were presented to Parliament during last session.

As stated in a circular sent round to members of the profession, it is some sixteen years since this matter was first formally brought forward and a Bill prepared; but in reality the subject was mooted by members of the Institute as long ago as 1854, and brought up in subsequent years, without, however, any action being taken. I mention these dates to show that inaction on the part of the Institute has been deliberate and intentional, and does not arise from any want of due consideration of so important a matter.

For myself, I was Honorary Secretary of the Institute from 1889 to 1892, when the question of registration was brought most prominently forward, and thus became well acquainted with the details of the proposals and the arguments for and against them.

Those arguments appear to me to remain much the same to-day, on both sides, as they were then. Then, as now, there was a considerable body of opinion in favour of the proposal, and I certainly do not wish in any way to minimise the amount of it. Then, as now, there was a considerable body of opinion strongly against it, and under these circumstances I venture to say, Gentlemen, the thing for the moment is outside the realm of

practical politics; for any experienced politician will tell you that Parliament would never grant compulsory powers of the sort proposed, except at the general request of the members of the profession interested, and at present there can be no doubt that the profession is sharply divided on the point.

I think I ought to say to you quite frankly, as your President, that personally I am not a supporter of the proposal at the present time, though I agree that the large body of opinion in favour of it cannot and must not be ignored. Evils there undoubtedly are, which should be removed; but, personally, I would try every possible alternative before applying such drastic remedies as those proposed by this compulsory registration, which, I believe, must be repugnant to every artist, even if he be a supporter of the proposal or not.

I am well aware that there are a large number of architects, especially amongst those practising outside the Metropolitan area, who are in favour of compulsory registration; but I find, amongst the leaders of our profession, those whose work we admire, and on whose judgment we rely, that they are, as far as I know, almost to a man, strongly against the proposal; and I say again, therefore, we should hopelessly divide the profession by pressing the proposal at the present time. Consideration it is bound to have, but acceptance is hardly likely to be obtained by putting a pistol to the head of the Institute and demanding registration or our life.

Remember, this proposal would not only register certain architects, but would decline to register others. A registration which gives one man a right to call himself an architect, and refuses it to another, is a very difficult and serious matter; and I must say I should be sorry myself to have to pronounce judgment, for while "A." may think "X." a good architect, "B." may not consider him an architect at all. Who, then, is to decide?

I think I clearly understand the grievance against which registration is proposed as a remedy. Put quite shortly it is this: an architect, let us say, in a country town, is endeavouring to carry out artistic work and to uphold the honour of the profession; but he finds much of the work he considers should go to him taken up by others who he knows are not artists in any sense of the word, and are untrammelled by any notions of honourable professional conduct, and have no right to be called architects at all. So he says, let a law be passed that every man must pass a prescribed examination before he can call himself an architect, and then will the public be able to separate the sheep from the goats. I admit the grievance, and sympathise most sincerely with my friend; but I doubt the wisdom or efficacy of the proposed remedy.

I would ask this question of those who favour registration. Is it proposed for the benefit of architecture or architects? I know they will say and believe it is for *both*.

Well, then, take the benefit to architecture first, as it should be taken. It will be admitted, I think, that good architects will do just as good architecture whether they are registered or not; it will therefore make no difference whatever to our best architecture. Our friend replies, That may be so, still it will prevent an enormous amount of bad architecture being perpetrated throughout the country by incompetent men. I take leave to doubt this; I fear that when registration became compulsory, though you would register much *ability*, you would also register much *inability*. That is the danger, and I fancy our friend would find himself worse off than before. Much of our building (it cannot be called architecture) is done by speculating builders, auctioneers, &c., who very properly do not now call themselves architects, and registration would not affect them as far as I understand it. It is true they would not be able to recover their charges as architects in a Court of Law, but builders are not paid by fees, and they would not call themselves architects. They will continue their work, and be perhaps even helped, for probably some of the best amongst them would work up

and pass the examination and carry on their poor buildings under the full authority and sanction of a Government diploma, and we shall see on the window blind "Estate Agent and Government Architect," and many suchlike combinations. Will this improve our architecture, or help our friend?

Then, again, we have generally thought a man who has the right to call himself an architect acquires the right by the buildings he has designed and whose erection he has superintended. This is the test we ask of our own Fellows, but this compulsory registration would require that he be hall-marked "Architect" by Government examination, probably before he has designed or superintended a single building. Surely this is putting the cart before the horse, and cheapening the title of architect! We admit Associates by examination, but require seven years to elapse and evidence of actual building before he becomes a Fellow. Suppose a man obtains the Government diploma, and his buildings turn out unsatisfactory, what will happen then? In fact, is it possible to decide on paper whether a man is an architect, or on the same evidence to deny him that honourable name?

Another difficulty is, What standard of architectural excellence is to be fixed for the right of this Government diploma? It must, apparently, be the same for the practitioner in a distant country district as for our larger cities. Is this fair or desirable?

Again I would ask, sympathising as I do all the while with this grievance, is all this ticketing and docketing compatible with our art? Protection is in the air, I know, and I am not rash enough to express any opinion upon it. But I do know that Art has always been free. Let us not be the ones to shackle it. An artist is born, not made; no questions or answers admit him into the fold, only his work. We are constantly being told that doctors and lawyers have these Government diplomas, and so ought we; and if we venture to suggest that painters, sculptors, and engineers have none and require none, we are told that has nothing to do with it. But why not? Are not painting, sculpture, and engineering more nearly allied to architecture than law and medicine? I should have thought so.

Then, as regards its benefit to architects, we are told that this diploma is essential in order to make the lazy ones work; the Institute examination, they say, is not sufficient inducement, and we must therefore compel them to come in. I can only say again, I do not think so. The lazy men we should admit for this reason had far better remain outside. Again, as regards the benefit to architects, I would ask you to remember that if this proposal were legalised to-morrow, the engineer, the borough surveyor, and surveyor, if members of the Institution of Civil Engineers or the Surveyors' Institution, would be exempted from all restrictions, and would continue to practise architecture precisely as they do at present: the registered architect would come to be looked upon more as a luxury or as a consultant, to be called in on very important matters only, and so a large part of the work, which is already so greatly encroached upon, would finally slip away from architects altogether. It would also be necessary that all those calling themselves architects at the time of the passing of the Bill, whatever their qualifications, would receive the Government diploma, so I am afraid our friend in the country town would receive no relief in his lifetime.

The words of the Memorial addressed to the Council in 1891 appear to me as true now as then—"That a Diploma of Architecture would be a fallacious distinction, equally useless as a guide to the public and misleading as an object for the efforts of the student." And, further, that "no legislation can protect the public from bad design."

While saying this, I would like those who are in favour of the compulsory registration of architects to believe that we are entirely in sympathy with every effort to raise the status of architecture and the architect in this country, and it is on this very account that I have ventured to discuss the matter at some length this evening.

It seems to me we must first come to some agreement amongst ourselves as to the standard to be set up, and how it is to be tested, and until this is defined registration would be useless and fallacious.

I am reminded of a story you will probably all remember, told by the late Bishop of London at one of our Dinners, of an Oxford Don leaning over a wall and watching two undergraduates trying to induce a tortoise to put his head out of his shell by holding out some tempting bait, but without result; and at last the Don quietly saying to those undergraduates, "Don't you think, gentlemen, you had better try the other end?" And I would venture to say to you, gentlemen, don't you think we had better try the other end? If, as I think, there is no probability of getting what we all want—a higher appreciation of architecture by legislation at the present time—would it not be better to redouble our efforts to gain the same results by raising the standard of architecture amongst ourselves, by encouraging the higher education of our young men, so that in time superior attainments may make membership of this Institute a recognised qualification in the eyes of the public, as I believe is the case already, to a great extent, not only at home but in the Colonies also?

Professor Kerr, in a very interesting address on registration, said it was open to question whether, when this Institute started standing committees on Art, Literature, Practice, and Science, it should not have added a fifth on Education, and I think he was right.

Education is everywhere the cry, and if the Institute is to take a more prominent part in architectural education, it will be necessary to depart, to some extent, from the position it has taken in this matter up to the present time.

Up to the present we have been satisfied, and I think rightly so, by endeavouring to arrive at and suggest a standard of architectural education by means of our examinations, leaving the preparation and education of students to others. During the last Session your Council had laid before them for their consideration certain draft proposals on architectural education, drawn up by a body of well-known architects interested in this question, though not at present members of this Institute, including such well-known names as Mr. Reginald Blomfield, Professor Lethaby, Mr. Mervyn Macartney, and Mr. Halsey Ricardo. These proposals set forth the proposition that neither the system of articulated pupilage nor the training in polytechnics and art schools had proved satisfactory, and that a combination of the two systems was desirable; that architectural education at present suffers from want of organisation, and should be taken up by a representative body of architects—such as this Institute—which shall be accepted by the public and profession as authoritative.

The proposals suggested a preliminary course of training in schools and workshops, and a subsequent course in the office of a practising architect, an endeavour being made to co-ordinate and bring into line existing institutions, by the adoption, in conjunction with these institutions, of a uniform system, with a central body such as this Institute at the head.

This, omitting all details, which are, of course, important, gives a fair idea of the proposals, and, I believe, commended itself to the Council as not only a desirable proposal, but also an eminently practicable one.

The Council having ascertained that the authors of these proposals would be willing to assist the Institute in working them out, by appointing some of their number to act on a Committee, the Council have appointed an Education Committee; and amongst those outside the Institute who have accepted an invitation to join our deliberations are Sir Arthur Rücker, Principal of London University; Mr. T. G. Jackson, Treasurer of the Royal Academy; Mr. Sidney Webb, L.C.C.; Professor Perry, of the Board of Education; and Mr. Basil Champneys; while the authors of the draft proposals nominated Mr. Reginald Blomfield, Professor Lethaby, Mr. Halsey Ricardo, and Mr. Macartney.

This Committee has met and discussed the matter and, with the aid of a Sub-Committee, has drawn up and adopted a report which is now under the consideration of the Council, and I am not, therefore, in a position to bring it before you, though I hope to be able to do so early in the course of the present Session. We are encouraged to hope that we may be enabled to obtain the co-operation of the various teaching bodies in London in the scheme, and in course of time to extend our operations to the chief cities of the kingdom.

We also hope to constitute a Board of Architectural Education, bringing upon it distinguished men interested in the subject, whether members of the Institute or not, its main duties being those of an advisory board on the courses of architectural studies in the various schools and their examinations.

As the scheme develops we hope to have the assistance of our Allied Societies, and to offer facilities to their members to participate in the advantages of these improved methods of education, and first and foremost we hope to unite in one great effort for the improvement of the education of our younger brethren and give them advantages we sorely miss ourselves.

I feel I must apologise for having detained you so long on purely technical points on such an occasion as this, leaving me, unfortunately, but little time to deal with architectural matters of more general interest.

The past year has seen some notable events in architectural history—the opening of Truro Cathedral, completed in the course of fifteen years, with the exception of its western towers; the selection of a design for the new cathedral of Liverpool; the opening up of a large portion of the Strand improvement by the London County Council, and the erection of an important building on a portion of its site; the adoption of a design by the same body for the new Vauxhall Bridge; and the selection of a design for the great university at Cardiff. Further progress has been made with the great Government buildings in Whitehall and elsewhere, including, it is understood, the purchase of the remainder of the Great George Street site; while the Government have completed their great Post-Office building at West Kensington.

It has been my good fortune to see Truro Cathedral since it was completed, and all who have done so will, I am sure, agree with me that the new nave is a noble addition to the building, and that, accepting the literal use of a previous style in which its designer was so thorough a master, the result is impressive and worthy of the great effort made by Cornishmen for its erection. The deflection of the main axis of the nave, some six feet, I believe, in a length of 300 feet, and mainly caused by the necessities of the site, lends, I cannot doubt, advantage to the general effect, both internally and externally. Externally one could wish the material had been entirely granite, but probably the cost of this would have been practically prohibitory.

Since last we met Liverpool has also decided upon a cathedral, designed on mediæval lines by a young man bearing an honoured name in the architectural world, whose success must be a matter of encouragement to young men and demonstrate once again the immense opportunities open to young architects of ability by the competitive system. It does not come within my province at this stage to refer critically to the design; but I am sure you will join with me in wishing Mr. Gilbert Scott success in his great and responsible undertaking. The appointment of Mr. Bodley, one of the assessors, as joint architect with Mr. Scott to carry out the work is not in accordance with our "Suggestions," and must not be looked upon as a precedent. The circumstances were very exceptional. I understand it was done with the complete concurrence of Mr. Scott, and was only agreed to by Mr. Bodley after great pressure had been put upon him, and when it became evident that the award would otherwise be put aside.

A note of warning greatly affecting London has been sounded during the last few days by the advertising for sale, for building purposes, of one of the principal squares in Kensington, which, if carried out, would greatly interfere with the amenities and healthfulness of the royal borough; and if the same process were carried through London it is almost impossible to realise the havoc that would be wrought. Fancy Berkeley Square, Belgrave and Eaton Squares, Bloomsbury and Gordon Squares, and many others, all covered with huge blocks of flats! This, of course, is not likely to happen at present; but as long as they are in private hands it might happen at any time.

Gardens with the backs of houses looking upon them are not so vulnerable, as they are difficult of access, and the houses themselves have considerable rights over them. I was myself offered the freehold of one of these gardens as a free gift some years ago, the owner being anxious to be free of its management and maintenance. But these gardens, as I pointed out last year, do not give to London what the squares do—a sight of grass, trees, and sometimes flowers. True, they might be kept much better than they are, and be made much brighter than they are; but as they are we are grateful for them. It has been suggested that Parliament should obtain some control over these open spaces, which would not interfere with landlords' and frontagers' rights, beyond the disability of covering them with buildings; and we must earnestly hope that Parliament and the County Council will lay their heads together to this end.

The widening of London Bridge is in full progress, and the temporary covered footways on either side suggest what picturesque and welcome adjuncts they would be to our bridges. These, the most exposed portions of our roadways, cannot be crossed in wet and windy weather without great discomfort, which those covered ways would entirely obviate.

While on the subject of our streets, we may be permitted to wonder what is to be the end of the forest trees planted on the verge of so many of our footways, delightful when young, but now they are up to the tops of our houses rather darkening and obstructing to the view of handsome buildings. The huge electric standards, also, now being planted down the centre of our streets, seem to require immediate attention, both as regards position, design, and the curious colour they are painted.

The visit of Mr. McKim last summer naturally brought into prominence American practice in matters connected with our art, and especially with the control exercised in America over public improvements, and he left in our Library a book containing a report which deals with the improvement of Washington by laying it out on a large and comprehensive scale; I commend a study of this book to all interested—and what architect is not?—in the laying out and improvement of our great cities.

This book recounts how a small body of experts were appointed to prepare and submit a general plan for the development of the entire Park system of the district. This Committee, I understand, virtually put aside their large and profitable private work for nearly a year and devoted their time and experience to the service of the nation, a sacrifice made without any pecuniary reward.

The Committee consisted of two architects, Mr. Burnham and Mr. McKim, a leading sculptor, Mr. St. Gaudens, and Mr. Olmsted, whose name is identified with what is best in garden architecture in America.

For the proceedings of this Committee I must refer you to their report, merely stating here that a short tour to the principal capitals of Europe was made, and then a comprehensive plan for the laying out of Washington was produced and laid down on the noblest and grandest lines, fully illustrated by drawings and models.

The Committee describe the realisation of the scheme as a stupendous task, much greater

than any one generation can hope to accomplish; but they add that the hearty and intelligent co-operation with which the plans have been received by the officers of the Government, the Committees of Congress, and the public generally, makes it practically certain that the development of the national capital will be prosecuted on the lines proposed.

Since this was written I understand a large sum has been voted, which will enable a substantial start to be made.

Again, at our Annual Dinner I ventured to give some particulars of a Commission appointed under the Charter of New York, composed of experts, who also act without fee or advice in all art matters in connection with New York.

This is carrying out to some extent the more complete system in existence in France, where the care of all public buildings in Paris is entrusted to (1) the Minister of Public Instruction and Fine Arts; (2) the Minister of Justice and Public Worship; (3) the Prefect of the Seine; and (4) the Prefect of Police. Each of these Ministers is advised by a Council, mainly formed of architects of distinction. The duties and constitution of these Councils are very fully set out in a book by our late Secretary, William H. White, entitled *Architecture and Public Buildings*, published in 1884, which contains a great deal of most interesting information on this subject. It is under this direction that Paris as we see it to-day has been produced, and the same system is followed all over France. As the author says: "None, having an understanding of these matters, can traverse Paris without feeling that the authority which initiates and controls the great works of architecture in that capital, is a real and competent authority, to which the State turns for guidance and on whose judgment the Parisians rely."

Every public building throughout France, great or small, has an architect attached to it, and, where necessary, an assistant architect, who, commencing in some humble capacity at the Council of Civil Buildings, in due time is admitted as assistant to this Board, or Council, which gives him right of presentation to a public building in course of construction, as subordinate to the architect who is carrying it out, spends his days on the works, and may rise, if he conducts himself well, to be assistant architect or joint architect to a building, and ultimately architect-in-chief. In course of time he is summoned to take the place of Councillor on one of the various Boards, and ultimately the Academy of Fine Arts, who educated him, will hear of him again, and finally elect him to their body.

Thus the State not only assists in providing an efficient system of architectural education, but also provides itself with an efficient body of trained architects to undertake its public buildings, all working on a well-defined tradition, and producing works of great excellence, which we cannot but admire. I do not propose to compare these systems with the course adopted in this country, partly because you are all well aware what that is, and also because I am afraid the comparison could hardly be in favour of this country. Not that I mean, for a moment, that the French system in its entirety would be suitable here; it tends no doubt to a loss of individuality, which would hardly be tolerated here, for though we talk a good deal of working on traditional lines, I am not sure whether we have yet learnt the lesson of sinking our own individuality sufficiently to do so.

I have mentioned these systems in force in France and America to draw attention once more, as I ventured to do last year, to the pressing need there seems to be in Great Britain, and which I think most of us feel, for some authority to whom schemes of public improvements should be submitted, not necessarily for sanction, but for consultation and advice. The work could hardly be entrusted to any single individual, but there would surely be no difficulty in finding men of skill, taste, and authority enough, and with patriotism enough to form such a Commission as that established in New York, and on the same terms, if asked to do so by His Majesty's Government.

And how enormously such a body would strengthen the hands of the authorities carrying out great works and the architects designing them; public confidence would be increased, and schemes would be executed which are now often either dropped altogether or carried through in a half-hearted way as a compromise—a method desirable no doubt in many concerns of life, but absolutely fatal where art is concerned. The essence of a work of art is its completeness, and there compromise can find no place. I do not mean necessarily high finish or elaboration, but the expression of a complete idea; take something away from it or add something incongruous to it and it is destroyed as a work of art, and though this is understood as regards painting and sculpture (for who would venture either to add to or take away from a fine picture?), it is in no way understood or recognised as regards buildings. A house is designed to stand on a broad terrace, the terrace is cut out and surprise expressed that the house does not look as was expected. A building is arranged with certain approaches which are entirely omitted, or in matters of detail the windows are divided with bars giving scale to a building, and these are cut out.

But I have wandered from my subject, viz. the need of some authority to whom to refer our public improvement schemes. A case in point has lately arisen on the question first raised by Mr. Hamo Thornycroft, on the alignment of the eastern end of the Strand Improvement Scheme. All who have taken part in that controversy will acknowledge the great consideration shown by the London County Council in the matter, first, by putting up boards to show the various proposals; and, secondly, by inviting representatives of your Council to meet their Committee and discuss the matter on the spot, which we did with great advantage, I believe, to both sides. But now who is to decide on the merits of the various plans? Would not the deliberate opinion of an independent body carry great weight with the public, who I believe are willing enough to pay, if assured they will thereby get a good thing? Since these words were in print the County Council has decided, and we have been officially informed that in the opinion of the Council not one of the proposals made (including that I presume of their own adviser) offers sufficient advantages to justify the Council in incurring the great expense which would be involved in increasing the already adequate width (100 feet) of the portion of the thoroughfare in question; and so what appeared to many brought up to consider such matters a great opportunity is lost to London. Public bodies appear to consider that the point on which all matters of public improvement have finally to be settled is the one of cost. No matter how good the suggestion, if it can be shown to cost more it is doomed. In other countries, where land in great cities is equally costly, it is recognised that spaciousness and dignity bear interest to a city higher than gold, by increasing the dignity of its life, the pride of its citizens, and the addition of a beauty that cannot fade. The decision may be right or may be wrong. My point is, and I speak with all respect: Are we satisfied with the competency of the tribunal to decide so important a matter?

Then, again, the solution of the Vauxhall Bridge design, which dragged on for so long, and was so happily settled as soon as collaboration between engineer and architect was established, would have been still further greatly accelerated had there been some such Commission to which the matter could have been referred.

Again, there is that most thorny question of the control of the great new street from Holborn to the Strand. The Committee of the County Council paid us the compliment of consulting us in the early stages, while the laying out of the street was under consideration, and also with regard to obtaining designs, with every intention, we fully believe, of carrying the accepted one through; but nothing has been done, so far, and this, as we firmly believe, not from want of will on the part of the Committee and officials, but from want of power, which the strong opinion of a generally recognised competent authority would have supplied.

Gentlemen, I venture to think the formation of such an authority should be advocated by this Institute, in conjunction with the public bodies concerned, and that finally something might be done to place this matter on a more satisfactory basis. The interest that architects naturally take in our cities, and London in particular, is my reason for bringing it forward.

The public are singularly apathetic in the matter. We have so long preached to them the beauty of old work that they have apparently taken our view and regard modern work with comparative indifference. They resent, and no doubt in many cases rightly, the least interference with ancient buildings, but treat with unconcern the vast modern changes now taking place in our cities. The study of the past, invaluable to the student, essential for instruction and refreshment to all of us, must not take the place—for us at least—of the all-absorbing present and future. Last century was spent by us in research and retrospection, let us now show the result of our studies and spend this one in action and progress. Let us see that our buildings are beautiful, as beautiful as we can make them, and with a beauty that tells of our time; not original, perhaps, but at least distinctive; let us see that they meet the present complicated requirements, that they are well placed for sun and air, cheerful, wholesome, gladdening; that we put something of ourselves into them, in order that they may give out something to others, and let us remember how great a responsibility rests upon us architects in our work. Ruskin, addressing the Architectural Association, once said: "What a peculiar importance and responsibility are attached to your work when you consider its permanence and the multitudes to whom it is addressed. We frequently are led by wise people to consider what responsibility may sometimes attach to words which yet, the chance is, will be heard by few and forgotten as soon as heard. But none of *your* words will be heard by few, and none will be forgotten for five or six hundred years, if you build well. You will talk to all who pass by; . . . all those little sympathies, those freaks of fancy, those jests in stone, will occupy mind after mind of utterly countless multitudes long after you are gone; you have not, like authors, to plead for a hearing or to fear oblivion. Do but build large enough and carve boldly enough, and all the world will hear you; they cannot choose but look."

Let us, then, resolve that we will go straight forward, adding our little something to the great story of our noble art.

"Guests of the ages at to-morrow's door,
Why shrink we? The long track behind us lies,
The lamps gleam, and the music throbs before,
Bidding us enter; and I count him wise
Who loves so well man's noble memories;
He needs must love man's nobler hopes yet more."

VOTE OF THANKS TO THE PRESIDENT.

THE RIGHT HON. LORD WINDSOR, P.C., D.L., First Commissioner of H.M. Works, who rose at the instance of the Hon. Secretary, Mr. Alex. Graham, asked to be allowed to express his thanks for the privilege accorded him to be there that evening and to propose a vote of thanks to the President for the remarkable Address they had just listened to. He also wished to say how very deeply he appreciated the honour—the distinguished honour—which had been conferred upon him by the President and the Council and the Institute in having his name read out as the receiver of an honorary distinction from the Institute. He

should have hesitated very much indeed in saying anything with reference to what had fallen from the President if the subject had been treated from a more technical point of view than it had been, but though in the early part of the Address reference had been made to matters relating to the administration of the Institute and concerning the registration of architects—matters on which he should not for a moment express any opinion—towards the end of the Address the President had dealt with matters that did not affect the Institute alone, but affected very deeply indeed the whole population of the kingdom, who had their

own share in the architectural work of the great towns and cities. There were one or two points he craved their indulgence to say a word or two about. The last subject that the President dealt with, was, he ventured to think, to the world in general, the most important perhaps—viz. his reference to the advantages and the importance of having some recognised body of competent persons who could be referred to and who could advise those who were responsible for obtaining designs for great architectural improvements. Some instances of the proceedings in other countries had been given, and that of the United States was of very great practical importance. It had been shown that the foremost architects and artists of America gave up their time and abilities freely to help the State in the great work of beautifying their cities, and he had no doubt that the foremost artists in all branches of Art in this country would not hesitate for a moment to give their services to the State in such honourable work. There was no doubt that London—and he mentioned London because it was the Metropolis, and was naturally foremost in their thoughts—had suffered terribly in the past from the want of a broad view of the manner in which their chief architectural works should be designed in order to make their city a magnificent city. Take for instance a part of London directly under the jurisdiction of the Government—Whitehall: if the design and the plan for dealing with Whitehall had, from the very commencement of the rebuilding of their public offices, been laid out on broad lines, a most magnificent approach to the Houses of Parliament could have been made. The blame for the failure to bring this about in no way attached to the architects, but to those who had instructed them. The architects had built fine buildings, but they had been only permitted to consider the actual work upon which they were engaged; there had been no particular reference to any building which was there before, and no reference whatever to any one that might follow. Though, however, they had lost many great opportunities, it was never too late to mend, and he wished to express his entire sympathy and concurrence with the President when he hoped that some such advisory body of competent persons should have a voice in the laying out on a large scale of the streets and buildings of London. He might go one step further. He had no right to express anything more than his own personal concurrence with the President's views; but he might say this, that if the views of the President were, as he believed them undoubtedly to be, the opinion of the Council and the Institute, he would gladly undertake to lay those views before His Majesty's Government, and whether it might be possible for anything to be done or not—for some time, at least—those views should be placed for consideration before the Government and no time

should be lost in having this expression of opinion fully considered. The President had referred to an important building for which the designs had been made, and with which he (Lord Windsor) had been rather intimately connected—viz., the new University College buildings at Cardiff—and he was glad to have the opportunity of saying that to the four architects who assisted them in South Wales and Monmouthshire to obtain designs for those important buildings, they were deeply grateful. The pity of it was that they had only money enough to erect a portion of one of the buildings, and the chief thing he felt as he looked at those designs was that they should all be built, that they should all take a concrete form. He trusted that South Wales and Monmouthshire would before long provide the money for a very much larger portion, if not for the whole of the selected design. The President had referred to the trees that had been planted in London along the streets. This raised rather an important question to those living in London: what was to be the future of the forest trees growing in the streets. His personal opinion was that they were too much afraid of the pruning knife. Trees in towns and cities should be made entirely subservient to the architectural features of the streets. Forest trees with branches that grew as they listed, suitable as they were for open parks and open spaces, were certainly not the kind to form the surroundings of architectural buildings. They had, he knew, a great difficulty to contend with in London—viz. the inevitable smoke question. Hardly any tree but the plane—although it might have grown beautifully when planted a hundred or a hundred and fifty years ago—could now stand the London smoke, and the plane was not easily to be dealt with with the pruning knife. There were difficulties to be got over, but he ventured to think that they must in some way treat the plane (as it could grow the best in London) to make a beautiful green support to the architecture of their streets. Touching this question of their trees and parks, he had seen recently an anxious letter in the newspapers, from which it appeared that there was an idea afloat that the Office of Works were about to make a new road across the Green Park which might be detrimental to its present character and beauty. He might say that there was no intention whatever, so far as he knew, of making a new road across the Park. Such a work would not be carried out until it had been sufficiently considered by Parliament, and, in fact, by the public generally. There was no intention whatever, and certainly not in connection with the Queen's Memorial, of cutting a new road through the Green Park. In conclusion he begged to propose a most hearty vote of thanks to the President for his able and instructive Address.

MR. HENRY T. HARE, President of the Architectural Association, London, said it was a

great pleasure and privilege to him to have the honour of seconding the vote of thanks so ably and eloquently proposed by Lord Windsor. The Annual Address of the President of the Institute was always looked forward to with pleasurable anticipations for a *résumé* of the events of the past year. In the present instance their President, Mr. Aston Webb, had the happy faculty of crystallising and expressing the thoughts which were in their own minds, and of expressing the thoughts which were also in his mind, in a manner at once concise, clear, and instructive. The ground covered by the Address was considerable. The question of registration, which had been dealt with in a more exhaustive manner than ever previously in their Presidential Addresses, was, and would be, he feared, for some time, a very burning one. There could be no doubt that the state of affairs which had given occasion for the promulgation of the Bill brought before Parliament last session was a very lamentable one, and on many grounds one could not fail to have considerable sympathy with the promoters of the Bill, although one might not sympathise with the exact means by which they proposed to attain their wishes. Perhaps the most interesting and most important point touched upon in the Address was that of the control of public buildings and important public improvements. That was one of the largest questions which concerned the architectural profession, and one of the most serious with regard to the development and improvement of London and other large cities. It was particularly gratifying to them to hear the manner in which Lord Windsor had accepted the suggestions made by the President in his Address, and it was a matter for congratulation to the Institute, and to the country at large, that a nobleman with such large and sympathetic ideas concerning architecture and the arts should be at the head of the Office of Public Works at the present time. That some such control must be instituted in the future—in the very near future he hoped—was evident to anyone who looked around him and compared the state of our own country with that of other countries on the Continent and in America. No one who had travelled could have failed to notice the way in which great public improvements were carried out in other countries, and to feel a sense of shame when comparing it with the way they were carried out in this country. The reason generally given for the small and mean spirit with which our public improvements were carried out was that it was the spirit of commercialism, and therefore the cheapest course was invariably adopted. That was the most narrow-minded and the worst course that could be taken. The scheme which was controlled by the greatest idea and governed by the largest lines was the one which in the long run would prove to be most remunerative. That was sufficiently evidenced by the great schemes for improvement carried out in

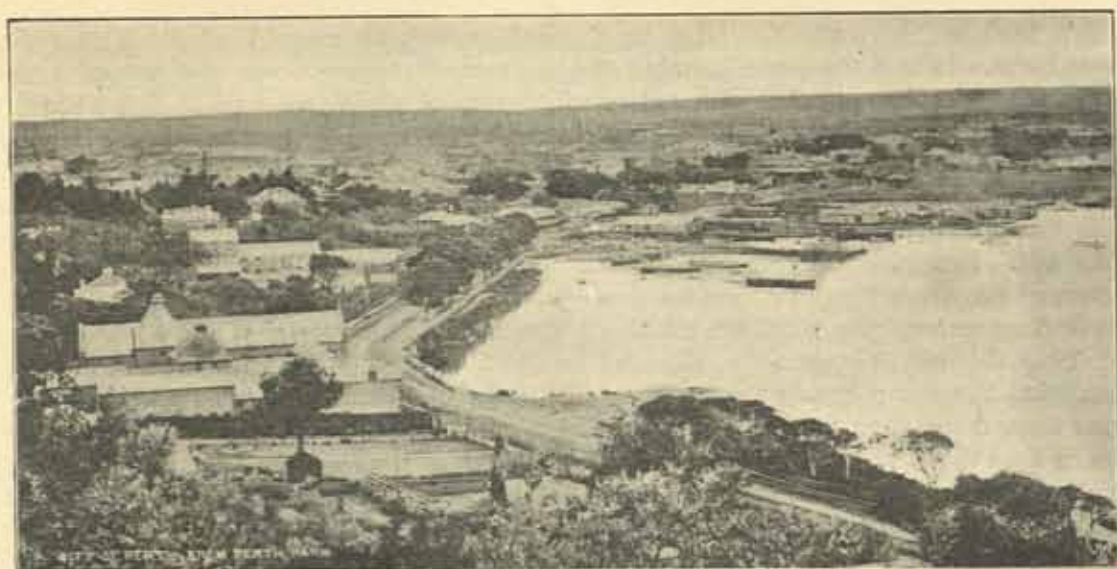
Paris during the last generation or two. Almost all such schemes had been remunerative both in the narrowest monetary sense, and much more so in their general advantage to the city. It was, however, on another footing that he wished to add a few remarks in seconding the vote, viz.—as President of the Architectural Association. Mr. Aston Webb was one of the most honoured of their Past-Presidents, and it was highly gratifying to him (the speaker), as having the honour to be President at the present time, to hear the very sympathetic way he had referred to the work of the Association and to what had been alluded to as “the great departure” about to take place in their removal to Tufton Street. The Institute and the Association had for many years been more or less in touch with each other, and the sympathy and support the latter received from the Institute had increased as the years went by. The association between the two bodies was becoming more and more intimate. For some years the junior body had had the privilege of using the Institute room for their meetings, a privilege they had appreciated very highly indeed; and now that they were removing to their new home in Tufton Street they had the advantage of the counsel and advice of the President and of the Council of the Institute in the steps which had been taken, and this had been crowned by a most generous donation towards their building fund. The work the Association was carrying out must appeal to all architects; it was that of the education of the next generation of architects. Everyone agreed that the education of architects under the pupilage system was not all that could be desired, and that much improvement could be made. This they were endeavouring to bring about by a system of teaching in a day school preparatory to pupilage. This day school had now been in force for two years, and the results so far were most gratifying. What it might lead to in the future was impossible to say, but he looked forward to the time when this work would be expanded to something very much larger than it was at present, and might some day supersede the system of pupilage altogether. That, however, was looking too far ahead; they must go slowly and step by step. There was, he believed, practically no system of pupilage in America; they were, he thought, endeavouring to make their training entirely a collegiate one. At all events, the step the Association was taking in the way of education must be for the benefit of the profession, and must command the sympathy and support of all those interested in the Arts.

Mr. REGINALD BLOMFIELD, M.A., said that the President had touched admirably in every case on a great many exceedingly interesting subjects, but he (the speaker) could not quite agree with Mr. Hare in thinking that the control of public buildings was the most important question now before architects. The education of the young architect, he thought, was a much

more important affair. They had to look to the future. They themselves who were now wrestling with their respective practices were now in action, and had to make the best they could of the training they had received, but they were most of them dissatisfied with that training and felt there was much more to be done, and which ought to be done. The President had sketched the general programme that was now before their Council. Some who were outside the Institute had been very glad to co-operate to the best of their capacity in preparing that programme. The position as they saw it was that the present state of architectural education was very unsatisfactory, and it failed apparently in two ways. The system of pupilage to which they had been used and which had been going on for years had many excellent points, but half the value of it was wasted because the student, when he went into an architect's office, did not know how to learn. He recollected when he went into his uncle's office about the age of twenty-three or so, after he had been there three months his uncle was very much surprised because he had not the slightest idea what a "mitre" meant; but there was no reason why he should know, as he had had no experience and no chance of knowing what a "mitre" meant before. That was not the right state of mind in which to enter an architect's office; the student ought to know what he was to look for and what he was to learn, and that was where the shoe pinched, and what, it seemed to him, they had to remedy. The idea was that the best solution would be an introductory training in a thoroughly well-equipped school. In that regard he thought the Architectural Association had done wonders: He never had been a member of the Architectural Association, but he had the highest possible admiration for it. For years, for two or more generations, it had pursued its way through good and ill report on its own resources and had done admirable work. It seemed now to be going stronger than ever, because it had taken fresh premises, and they hoped to see it become the nucleus of a school of training; but it was practically on its own resources. They, the educational reformers, would like to see it reinforced. It seemed to them that the Association required more equipment than could ever be provided by an individual body working on its own resources, and that was the point at which the reformers—he would not say attacked it, but wanted to develop and organise, so that the system of technical education might be advanced to a further point than it had at present reached. They would like to see the school system, as administered by the Architectural Association, supplemented by a very complete system of training in what was roughly called "the workshop," but which in connection with modern technical training was generally called

"the laboratory." The laboratory in the case of an architect was not a place to manufacture chemicals, but a place where the student would come in contact with the actual facts with which he would have to deal for the remainder of his career: that is to say, when he had to design a building and draw up a specification he would have some rudimentary idea of what the work was, and would not specify timber with impossible scantlings, or things of that sort, which one had known young architects to do. The pupil had very little opportunity of learning this in his master's office; he saw the drawings passing before him, but very often he had no idea what he was doing; he drew away bravely, but did not grasp the thing. Now they wished to enable the student to visualise the matters he was dealing with. That was one point with regard to this laboratory idea; another point was that it should give the opportunity of research into the constructive problems they all had to solve. That was a point in the study of architecture which had been altogether neglected since the days of Wren. They had had a succession of excellently skilful architects who had pursued one manner after another since the days of Wren, but he doubted if any of them had studied construction; they had been good constructors incidentally, but they had either taken it for granted or not bothered themselves about it, except with regard to the particular question at the time. They had been for pretty nearly two centuries working on that line, and it seemed to him, and indeed to all of them, that it was about time to get out of it. The programme in front of them was undoubtedly a very large one, but it was not revolutionary; the idea was to develop and co-ordinate existing systems, and that was a programme, he thought, which should appeal to all architects. Those senior members of the profession who were past masters in the art, and who also enjoyed the advantage of being on the right side of the table, should put their shoulders to the wheel as well as the rest of them, and to the members of the Institute he would particularly appeal. The Institute had in its President an architect of rare sagacity and tact, who more than anyone was likely to lead this scheme to a good issue. It was, he thought, the duty of all architects to co-operate in this scheme, and in connection with any programme put before them to give it at least a candid and impartial hearing.

THE PRESIDENT, in responding to the vote of thanks, said that their obligations really lay more to their visitors. They were much honoured to have had Lord Windsor with them, and much obliged to him for the sympathetic way in which he had entered into the proposals brought forward in his Address. They were also very much obliged to the other distinguished men, painters and architects, who had honoured them by their presence that evening.



THE CITY OF PERTH, WESTERN AUSTRALIA.

By R. M. HAMILTON [A.].

PERTH, the capital of Western Australia and the seat of government, is at the present moment the most flourishing town of the young Commonwealth. It is a rapidly increasing community; within the city limits there are about 40,000 inhabitants, while without there are four or five smaller municipalities with growing populations. These boroughs in two cases are only separated by the artificial limit practically of the width of a street, causing clashing of interests, which friction will most probably increase when it comes to the consideration of a completer water supply and a proper system of drainage.

Perth is very prettily situated on the north side of the Swan River, which expands out into a small lake on the south side of the town, and also bends round to the north to form the eastern limit of the city. The streets are oriented nearly according to the four points of the compass, most of them fairly wide, but by an unaccountable lack of foresight Hay Street, which has become the principal busy street, was reduced in width a good many years back. The disadvantage of this is now fully seen, and the false economy realised. Though the town has been a municipality a long while, its progress was very slow up to the time of the great gold finds at Coolgardie, Kalgoorlie, and further inland nearly ten years ago. In common with the country at large, it has happily prospered since the goldfields have been opened up. It must be admitted, too, that city councillors have been alive to their responsibilities, and have kept pace with the expansion as far as funds would carry them. It has been a period of constructing works, the making of streets, the laying out of squares and gardens and recreation grounds which had only lain as reserves in a state of nature—mostly sand—on the city maps. Now the city possesses a fair number of lungs prettily laid out and cared for, notably the Queen's Gardens, which four or five years ago were ugly scarred excavations and clay pits deserted by brickmakers. They have been transformed by the gardener's spade into a favourite beauty spot.

While on the subject of the beautifying of the city, mention must be made of the

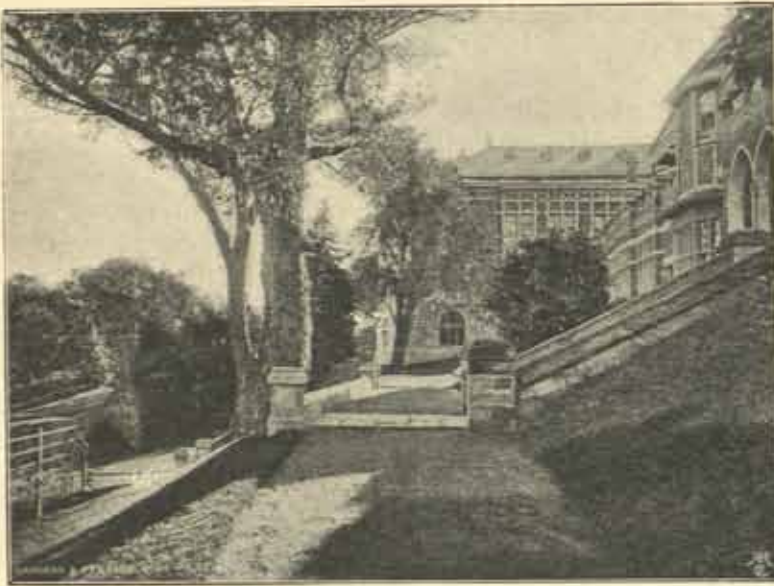
King's Park, on the west side, lying on elevated ground, on one side of which runs the Swan River. It is a reserve of nearly 1,000 acres, mostly covered with the natural bush, and in the springtime carpeted with native wildflowers of varied sorts called into a sudden and brief existence by the returning warmth which converts the sandy soil into a forcing bed. A high cliff of between 180 and 200 feet dominates the river for some distance, and from the winding drive along the summit charming views are visible of the city and the distant reaches of the river below, where it expands again into lake-like stretches of water, quite salt. It may confidently be said that few cities are more happily situated amidst picturesque surroundings; for from the same point of view may be seen the blue slopes of the Darling ranges, lying about ten miles east of and inland from the city.

Since the influx of population attracted to the State by the goldfields the old city has been going through a steady process of rebuilding in the hands of capable architects who came from the eastern States. They brought a good style with them, and the new city started from the same point as that reached by the older parts of the colony. The street architecture is equal, and the domestic villa of the modern Eastern style suitable to a hot climate. The exteriors, too, are not at all behind what may be seen in the East, though of course the large majority are of no great size. Many of the best villas are to be found at a suburb—Claremont—on a lower reach of the Swan River, about five miles from Perth.

At the present time the building trade is very active, with indications of continuance during the present year. Dwelling-houses are in great demand, as the population is still rapidly enlarging, and the outer ring of the city, especially to the north, is rapidly being built upon. The business portion is centred in Hay Street and Barrack Street for shops and retail businesses, and St. George's Terrace for financial companies and banks. This latter is the finest thoroughfare—broad, with a boulevard appearance owing to its well-grown trees on either side. In it are situated the Post Office, which has quite an early French Renaissance feeling about it, and most of the large Civil Service departments. Close to these, and somewhat back from the terrace on a slight elevation, is the plain brick Cathedral. It has nothing very noteworthy to remark upon. The plain red brick interior is not relieved in any way. Lately the tower has been raised as a Jubilee memorial, and hung with a rather poor peal of bells.

Nearly opposite the Cathedral, standing in spacious well-laid-out grounds, is Government House, looking out on the river down to which the gardens slope. It is an old-fashioned rambling brick edifice, of a poor Tudor style of architecture, to which lately a large addition has been made of a spacious ball-room and supper-room, to provide for a numerous company, such as the old house could not accommodate at the later receptions. All the Government buildings, such as schools, post-offices, court-houses, and the varied buildings necessary for the administration of the government, are designed in the architectural department under the charge of the Colonial Architect. The latest of these official buildings to be carried out are the Supreme Courts, near Government House, overlooking the river, now almost completed, and the new Legislative Houses. The latter are situated at the west end, near the King's Park, on a fine lofty position. They will overlook most of the city, and be seen from it. They are being built on the unsatisfactory system of a portion at a time, with other temporary buildings to make shift with, and will be completed as money is voted for that purpose by the Legislature. Neither of these important undertakings can be said to have had money wasted on it as far as the external design is concerned.

The centre of the city may be considered as at the intersection of Hay Street, running east and west, with Barrack Street going north and south. At this point stands the Town Hall, including the Municipal Offices. A lofty square tower abuts on the intersection of these



GOVERNMENT HOUSE AND GROUNDS.

thoroughfares. It is not unpleasing in outline, but the whole building was erected at a time when the knowledge of detail among local architects was very poor. It is inconvenient for the present requirements of the city administration, and a new home for the City Fathers will at no distant date be built elsewhere.

The style of buildings has kept pace with the growth of the town and the influx of ideas from the eastern cities, and all large businesses when rebuilding are erecting very creditable brick buildings. There is

very little stone work to be seen, except in bases and stringcourses, in some instances, for no good local stone has yet been unearthed. There is plenty of limestone, of a poor soft nature, which is used for rough rubble work, and to a certain extent in villa architecture, but it has little to recommend it. The bricks, again, are of a very poor description, badly shaped and ill burnt by a large majority of makers. While the present busy demand for any sort of brick continues, there is not much probability of improvement taking place. An attempt is now being made to form a company to take up the new German patent for making a compressed brick of nearly pure sand and lime: it would certainly be a cheap article here where sand and limestone exist together along the coast in limitless quantities.

Of late much better attention has been paid to the streets, and in the centre of the city jarrah wood-block paving has been laid down over a large part of Hay and Barrack Streets, and others contiguous to them. The advent of electric tramways induced this, as the opportunity was taken while the solid road-bed was being laid for the tramways to bring the streets up to modern standards. It is costly for a



ASTRONOMICAL RESIDENCE AND OBSERVATORY.

young municipality to do this, as the first charge is heavy; but if kept well looked after it will no doubt be economical in the end.

The style of most of the edifices here is a free Classical, or Queen Anne, common to all the colonies, the banks and large financial institutions keeping more closely to Classical features. Of those lately erected the most successful probably is the Bank of New South Wales, in St. George's Terrace, designed by the late Mr. Salway [F.]. This was carried out by him shortly before he returned to Victoria, where he died. The materials are red brick, of a good deep colour, imported from Victoria, and good sandstone from Sydney.

All the ornamental features to buildings are done in cement; foliage is cast and pressed in moulds and stuck into place. No moulded bricks can be obtained locally, and a high pro-

hibitive import tax was placed on those coming from the eastern States, which has effectually barred the use of them.

Labour is very dear in the building trades. As an example, plasterers of any sort have lately been receiving 11s. 3d. for a day of eight hours, while a carpenter may get his £4 a week. A good deal of soft timber for flooring and clear timber for joinery comes in Scandinavian ships from the Baltic, while for joists, rough and large pieces, American ships bring the largest balks of Oregon from Puget Sound. A great deal of jarrah is of course used, especially



MOORE'S CHAMBERS, CORNER OF ST. GEORGE'S TERRACE AND BARRACK STREET.

for any work on or near the ground, on account of the attacks of the white ants. They will very soon riddle any piece of soft wood on or near the ground, if they can get to it, and their instinct for making their way to such wood is really marvellous. They suddenly appear in a spot isolated to all appearance from anything in the shape of wood by which they could connect themselves to their new habitat, having unerringly made their way below ground. Here they do not make any tunnel above ground. They attack karri very freely, but not jarrah.

A very good type of villa, as I mentioned above, is now being erected. The smallest has a verandah of some sort, generally on two sides. In the larger houses the verandahs are wide and roomy, and perhaps will extend all round. There will generally be found a good wide one at the back, which is fully made use of during the heat of summer, when work in the kitchen is anything but a pleasure. French tiles from Marseilles are used a good deal on the roofs of the better class of house, but galvanised corrugated iron is the ordinary material. This is generally given two coats of white paint, or of refrigerating compound, to reflect some of the summer heat. The roofs are poorly constructed to withstand heat as a rule, for the iron is laid on the battens, without the intervention of boarding or felt of any

sort to intercept the heat. The roof space becomes very heated, therefore, in spite of most gables being provided with louvre ventilators of some description.

Coming to the question of those services generally undertaken by a corporation, that of the water supply is not under the control of the city. The reason is that the service was originally a private venture, which supplied water to parts outside the city proper. This service being very indifferently managed and unsatisfactory, the Government bought out the company and established a Metropolitan Water Board, which controls the service. It supplies water to a large area, continually extending, outside the city boundaries, among those small boroughs growing up whose existence was earlier referred to and regretted. The reservoir and catchment area is among the Darling ranges, about twenty miles east of the city, but the storage capacity is becoming inadequate to the rapidly growing requirements. The supply is partly increased by the flow from some artesian bores put down in different localities, but their water is not of very good



CONGREGATIONAL CHURCH, ST. GEORGE'S TERRACE.



HAY STREET, SHOWING TOWN HALL TOWER.

quality. It is said that it is difficult to filter the water efficiently owing to a very fine clay suspended in the water rapidly clogging the filter beds. An experiment is being made at the distributing reservoir in the city with filter-cloths to improve the quality of the water. Fair success is apparently being met with, though the water is not up to a high standard. The question is being discussed for providing an ample supply from the same neighbourhood, which shall provide for a large district embracing Fremantle, twelve miles south of Perth, and the whole intervening district

Fremantle is the port of Perth, with a population of about 20,000. It has a very indifferent water supply, about which much outcry is made.

There is no system of sewage or deep drainage, nor would the water supply at present be sufficient to admit of one. The removal of excreta by the pan system is contracted out by the City Council. Storm-water drainage is only partly provided for and being extended. The heavy winter rains for the most part find their way into the sand and percolate away anywhere. This does not apply, of course, to the centre part of the city.

The streets, on the whole, are fairly well looked after, considering the heavy drain on the city purse for the formation of new streets, as a large part of the city is in the stage of construction. Owing to the sandy nature of the ground no good bed can be obtained for road-making; and this entails a somewhat high cost of formation.

Gas and electric light are used for lighting purposes, both supplied by one company having a monopoly. The city contracts with the company for the street lighting, which, consequently, is very indifferent, as is the quality of the gas. Most of the large shops and wholesale businesses and most of the large private houses give preference to the electric light. To meet the growing demand the company has had to increase its power, which will soon be fully utilised.

The electric tramways have been lately established, and are still being extended. They have been well put down, and are very good, as they include most of the recent advances made in that direction. For this reason they may be taken as being on a par with the best anywhere.

Owing to the exertions of public bodies such as the Local Board of Health the city and neighbourhood are in a much better sanitary condition than a few years back, when the resources of the services broke down under the sudden strain put upon them by the sudden influx of population. The health returns are fairly good. The city is situated in one of the finest climates in the world. Although this great country has no great assets like New Zealand in the shape of natural beauties to attract the tourist, I can confidently assert that for delicate people the climate can rival the Riviera for health-giving and health-restoring qualities. All the amenities of life can now be obtained here, and civilisation in no wise lags behind the rest of the world. There is a fine public library, continually crying out for elastic walls to provide for its congested growth, and an ever-extending museum, which contains a very fine collection of gold specimens.

It would have been of interest to refer to one of the goldfields towns, such as Kalgoorlie, nearly 400 miles inland, but I am afraid it would have extended this article too much.



9, CONDUIT STREET, LONDON, W., 7th Nov. 1903.

CHRONICLE.

Exhibition of the "Dessins Tournaire"

By the courtesy of the French Government and through the good offices of the British Ambassador at Paris the Council have been able to arrange for an exhibition of the drawings known as the "Dessins Tournaire" belonging to the Académie des Beaux-Arts. The drawings will be on view on the occasion of the reading of the Paper by Monsieur Homolle on the Treasury of Cnidus and the Monuments of Ionian Art at Delphi, on Monday, the 16th inst. It is hoped that a large number of members will assemble on the occasion to welcome Monsieur Homolle, who is coming from Athens to London expressly to deliver this lecture.

The Opening Meeting.

The proceedings at the Opening Meeting last Monday were of more than ordinary interest. The subjects brought forward by the President concerned not merely questions of local and professional interest, but matters of pressing moment to the entire community. The main heads of the Address were the question of the election of Fellows, the legal registration of architects, architectural education and the appointment by the Council of an Education Committee, the preservation of the old London squares, the great public improvement schemes, and the need for a competent authority to deal with them. The presence of the First Commissioner of Works lent added interest to the meeting. Lord Windsor proposed the vote of thanks for the Address, and in doing so frankly confessed his entire sympathy and concurrence with the President's views as to the establishment of an authoritative body who should advise on schemes of public improvement. His Lordship added that he would gladly undertake to bring these views before the Government, and no time should be lost in having them fully considered. The brief outline given by the President of the education scheme now before the Council, the proposals to establish a permanent Board of Architectural Education, and to develop

and co-ordinate existing teaching systems, were warmly applauded. Besides Mr. Reginald Blomfield, who spoke at the meeting and gave some details of the scheme, there were present Mr. Mervyn Macartney, Mr. Halsey Ricardo, and others responsible for the education proposals referred to.

The Strand Improvement Scheme.

The action taken by the Institute Council in the matter of the alignment of the eastern end of the Strand in the improvement scheme now in progress is sufficiently disclosed in the subjoined report of the L.C.C. Improvements Committee, which was communicated to the President on the 22nd ult., together with the official notification of the County Council's decision. The first letter from the Institute, dated 21st May, is fully set out in the report, and reference is made to the interview between representatives of the Institute and the Improvements Committee, when the Institute proposals were fully gone into. This meeting took place by invitation of the Improvements Committee on the Aldwych-Strand site, near St. Clement Danes Church, on the 8th July, and the President, Hon. Secretary, and some members of Council were present on behalf of the Institute. Mr. Hamo Thornycroft, R.A., who was prepared to withdraw his own suggestions in favour of the proposals put forward by the Institute, was also present. A plan was afterwards prepared showing definitely the Institute scheme, and in submitting it to the Improvements Committee it was pointed out for the Institute that some equivalent in land could be obtained by reducing the width of two cross-roads from 50 feet to 45 feet, which could be done without detriment to the scheme. In considering the matter finally the Institute Council had the advantage of the presence of Mr. T. G. Jackson and Mr. Thornycroft, who entirely concurred in their proposals.

The final report of the L.C.C. Improvements Committee is as follows:—

We reported on 28th July 1903, that we were giving careful consideration to several suggestions which had been made to us for the alteration of the line of frontage already adopted by the Council for the northern side of the Strand, between the Church of St. Mary-le-Strand and that of St. Clement Danes, and we are now in a position to submit a definite recommendation to the Council upon the subject.

As stated in our former report, the Holborn to the Strand improvement now being carried out by the Council received the sanction of Parliament by the London County Council (Improvements) Act, 1899, and it will be within the recollection of the Council that before the scheme as submitted to Parliament was approved by the Council, we consulted the Royal Institute of British Architects, with the result that the scheme which was finally adopted by the Council was one which embraced the suggestions made by the Royal Institute after we had slightly modified the Institute's plan in order to make the crescent road (Aldwych), connecting the new main street with the Strand, more symmetrical. By this scheme a minimum width of

100 feet was to be provided for the thoroughfare of the Strand, as well as for the streets leading to Holborn and now named Aldwych and Kingsway. The width of the Strand immediately to the east of its junction with Aldwych at Wellington Street was proposed to be 100 feet, and a similar width was provided for the Strand immediately to the west of its junction with Aldwych at St. Clement Danes Church. This width gradually increased to about 160 feet to the east and also to the west of St. Mary-le-Strand Church, in order to provide a minimum width of 50 feet for the traffic on each side of the church. In the large open space between the eastern end of the crescent site and the western side of St. Clement Danes Church, the Council agreed, on the 13th March 1900 (p. 357), to allot to the Gladstone Memorial Committee a site for the purpose of the monument proposed to be erected by the Memorial Committee. Nearly all the houses situated between the Strand and Aldwych have been acquired and demolished; some of the land has been staked out and the Council has invited offers for building leases.

We have had before us, however, a letter, dated 21st May 1903, from the Royal Institute of British Architects calling attention to a letter which appeared in *The Times* on 4th May 1903, from Mr. Hamo Thornycroft, R.A., suggesting a considerable amendment of the Council's line for the northern frontage of the Strand between the two churches, with a view (a) to bringing the church of St. Mary-le-Strand into alignment with the centre of the thoroughfare, (b) to making the direction of the thoroughfare aim at the front of the church of St. Clement Danes and not at one corner of it, and (c) to securing for the future a good view of the Courts of Justice to all approaching that building from the Strand on the west. The Royal Institute has stated that, although in entire artistic sympathy with Mr. Thornycroft's scheme, it is fully alive to the difficulties, financial and otherwise, in the way of its execution, and the Royal Institute has therefore suggested a modification which it thinks could be carried out with a comparatively small sacrifice of pecuniary interest, and would practically secure the advantages of Mr. Thornycroft's scheme. By Mr. Thornycroft's proposal, the portion of the Strand between the eastern end of St. Mary-le-Strand Church and Aldwych would be widened to an average width of 150 feet; by the Royal Institute's plan the average width would be about 120 feet. The Royal Institute has contended that by carrying out its plan a better view would be afforded of both churches from either end, and also of the Law Courts, and the apparent narrowing of the Strand at the point in question would be obviated, and that, although the eastern end of the crescent site would not be entirely symmetrical with the western end, this would be observable only on paper and would not be seen when the actual work was carried out. The Royal Institute has also pointed out that by further widening the Strand in the manner suggested the sharp corner at the eastern end of the crescent site, as contemplated by the Council's plan, would be avoided.

We have also had before us a letter from the Royal Academy of Arts suggesting that the fullest consideration

should be given to Mr. Thornycroft's proposal, and a memorial from the Further Strand Improvement Committee, forwarding a plan showing an amended line suggested by that committee, the line being somewhat similar to the one originally proposed by Mr. Thornycroft, and providing an average width for the Strand of about 155 feet. In their memorial the Further Strand Improvement Committee contend that by their plan (a) the Strand would take its natural course direct to the Law Courts and Fleet Street; (b) the Church of St. Mary-le-Strand would be brought into alignment with the thoroughfare; (c) an island pavement would be provided where trees might be planted and seats placed in one of the busiest thoroughfares in London; (d) that while the building frontage would be reduced the value per foot of the remaining frontage would be increased by the widening of the thoroughfare; and (e) that the proposal has the support of several of the metropolitan borough councils who have had before them the memorial in question.

Upon receiving the letter from the Royal Institute, we were impressed with the importance of the suggestions made, and we accordingly invited certain of its representatives and also Mr. Thornycroft to meet us on the site, in order that they might fully explain their proposals to us, and we have since had before us a plan submitted by the Royal Institute showing definitely the scheme which it now proposes.

For the information of the Council we have caused a cartoon plan to be prepared and to be hung in the Council chamber, showing, by black lines, the scheme as contemplated by the Council; by dotted blue lines the considerable modification originally suggested by Mr. Thornycroft in his letter to *The Times*; by yellow lines and dotted yellow lines the scheme put forward by the Further Strand Improvement Committee, which is somewhat similar to the one originally suggested by Mr. Thornycroft; by red lines the proposal now made by the Royal Institute of British Architects; and by green lines a suggestion laid before us by the Council's superintending architect, by which plan the aggregate width of the Strand would be 115 feet. It is right to state that Mr. Thornycroft at his interview with us has expressed himself as being generally in accord with the proposal now made by the Royal Institute.

If the modification originally suggested by Mr. Thornycroft, and shown by dotted blue lines on the cartoon plan, were carried out, it would necessitate the addition to the public way of the Strand and Aldwych of land which would otherwise be let for building purposes and is valued by the Council's valuer at £350,000, to which must be added the cost of altering the existing vaults, paving, &c., estimated at £10,000, making a total of £360,000; the loss of recompense if the Council were to adopt the plan submitted by the Further Strand Improvement Committee, shown by yellow lines on the plan, would be £239,400 for land and £10,000 for works, making a total of £249,400; the loss of recompense if the Council were to adopt the amendment suggested by the Royal Institute of British Architects, as shown by red lines upon the plan and now accepted by Mr. Thornycroft, is estimated at £70,000 for land surren-

Suggested modified Line of Frontage	Average width suggested for the Strand	Value of land surrendered to public way	Estimated cost of altering vaults, paving, &c.	Total cost of adopting suggested alteration of frontage	Cost of erecting buildings on land given up	Rental value per annum	Loss in rates per annum		
							To Westminster at 5s. 3d. in the £.	To the Council at 1s. 4d. in the £.	Total
(a) Mr. Thornycroft's first plan	150	£ 250,000	£ 10,000	£ 260,000	£ 85,000	£ 16,740	£ 4,414	£ 1,169	£ 5,583
(b) Further Strand Improvement Committee's scheme	155	239,400	10,000	249,400	82,800	12,680	3,344	886	4,230
(c) Royal Institute of British Architects' plan	120	70,000	4,000	74,000	16,475	3,295	868	279	1,097
(d) Council's Superintending Architect's plan	115	55,000	4,000	63,000	14,690	2,890	761	201	962

dered and £4,000 for alteration of vaults, paving, &c., making a total of £74,000; while the loss to the Council if the suggestion made by the Council's superintending architect, and shown by green lines on the cartoon plan, were adopted, is estimated at £59,000 for land and £4,000 for vaults, paving, &c., making a total of £63,000. In order that these figures and also the loss in rates by the adoption of any one of the four schemes may be fully understood we give the preceding table [see p. 22].—

We may remind the Council that members have had an opportunity of studying the question on the site, because we arranged for the erection, before the summer recess, of poles and boards upon the vacant land on the northern side of the Strand between the two churches, the boards being painted in different colours to show the several modifications suggested.

After the most full and careful consideration of all the facts, and having carefully viewed on the site of the improvement the effect of the various proposals made, we have arrived at the conclusion that the width already provided by the Council for the widened Strand, namely, a minimum of 100 feet, is in every respect ample for the present and prospective traffic. It must not be forgotten that, when Aldwych and Kingsway are completed, much of the traffic passing to and from the new street and the southern, eastern, and western parts of London will not use the portion of the Strand between Wellington Street and the Law Courts: that part of the thoroughfare will accordingly be used almost entirely by the traffic passing from Fleet Street westwards and from the western portion of the Strand eastwards to Fleet Street. Fleet Street is being widened by the City Corporation to 60 feet, and the Council is contributing part of the cost. The portion of the Strand opposite the Hotel Cecil has been widened, at the cost of the Council, to 80 feet, and the same width has been adopted for the improvement at the portion of the Strand east of the Hotel Cecil and opposite Beaufort Buildings, now being undertaken by the Westminster City Council, with a contribution from the Council. It will be apparent, therefore, that, while the portion of the Strand between Wellington Street and the Law Courts will presently be relieved of a large amount of traffic which at present passes along it, the Council is providing a width of street far in excess of that which has been adopted for other portions of the same line of thoroughfare. Moreover, the width of 100 feet is considerably in excess of that generally adopted for street improvements in the past. During the 33 years of the Metropolitan Board of Works the average width adopted for main thoroughfares was 60 feet, which in our opinion was in some cases not sufficient. Charing Cross Road and Shaftesbury Avenue should, we think, have been made more than 60 feet wide; but there is a very considerable difference between the 60 feet provided for those thoroughfares and the 100 feet to which the Council has widened the Strand at that part which shortly will be relieved of some of the traffic. Very few streets constructed by the Board were as wide as 80 feet, and the only thoroughfares which exceeded that width (80 feet) were Northumberland Avenue (90 feet) and the Victoria Embankment (100 feet). The Council when effecting county improvements has, whenever possible, adopted a width of 70 feet and 80 feet. With these facts before us, it appears that any proposal for increasing the width of 100 feet for the portion of the Strand between Wellington Street and the Law Courts cannot be made merely on the ground of meeting the needs of the traffic, but must partake almost entirely of the nature of an æsthetic proposal, the chief argument in support of the proposal being to secure better architectural effect by bringing into greater prominence the church of St. Mary-le-Strand and the Law Courts. We have not yet been convinced that by throwing open to view various portions of the Law Courts buildings the architectural effect in the Strand would be

considerably enhanced; but, whether this would be so or not, we feel that the Council would not be justified in incurring so large an expenditure as would be involved in securing a doubtful enhancement of the architectural view in the Strand. Having regard to the great width already provided (100 feet), it will be possible to secure under the Council's scheme an imposing effect for the buildings to be erected on the northern side of the Strand. In view of all the facts above stated, we have to submit the following recommendations to the Council—

(a) That no alteration be made in the present northern line of frontage in the Strand between Wellington Street and the Law Courts, as in the opinion of the Council not one of the proposals made offers sufficient advantage to justify the Council in incurring the great expense which would be involved in increasing the already adequate width (100 feet) of the portion of the thoroughfare in question.

(b) That a copy of the foregoing report, and the Council's resolution thereon, be communicated to the Royal Institute of British Architects, to Mr. Hamo Thornycroft, and to the Further Strand Improvement Committee.

WILLIAM DAVIES, *Chairman*.

The October Statutory Examinations.

Examinations of candidates for the offices of District Surveyor under the London Building Act, and of Building Surveyor under Local Authorities, held by the Institute pursuant to statute, took place on the 22nd and 23rd ult. Of the five candidates in the District Surveyors' Examination, four passed, viz.:

WALTER GODFREY GREEN, 3 Heathfield Road, Acton.

ERNEST WILLIAM LEES, 35 Mecklenburgh Square, W.C.

ARTHUR GEORGE MORRICE, Beechcroft, Upper Tooting Park.

ALBERT PERKINS STOKES, 1 Addington Road, Bow, E.

In the Building Surveyors' Examination there were two candidates, and the following passed:

WILLIAM DAVID JENKINS, 12 Frederick Road, Sparkhill, Birmingham.

The Council have granted the successful candidates Certificates of Competency to fulfil the duties required in the offices referred to.

Vandalism at Norwich.

Mr. Walter Rye, a well-known archaeologist, now residing at Norwich, has issued an illustrated leaflet detailing acts of Vandalism at Norwich perpetrated by the Dean and Chapter of that city, to which he desires to draw public attention.

Fronting Bishopsgate, and enclosing the lower precinct of the Cathedral, is a massive flint wall, 2 feet 6 inches thick, and probably 600 years old. A great length of this wall has been pulled down and a row of red-brick villas are in course of erection, which form a bad foreground to the cathedral in the rear. The ground-rent obtained by the erection of these villas is only £7 10s. per annum, and it is contended that this small sum

does not justify the destruction of the ancient wall and the substitution of incongruous buildings.

The Dean has, it is said, cemented the lower portion of the interesting flint house in which he lives, and the precinct wall opposite St. Helen's hospital is used as an advertisement station by the Dean's tenant.

A cast-iron urinal has been erected on Tombland, partly obscuring and degrading the Erpingham Gate, but this erection is, we assume, to be attributed to the action of the local authority and not to the Dean and Chapter.—JOHN HEBB.

The late H. W. Brewer and the late Dr. Corfield.

Mr. ALEXANDER GRAHAM, F.S.A., *Hon. Secretary*, at the meeting last Monday, in making formal announcement of the losses the Institute had sustained by death since the previous meeting, dwelt specially on the late Hon. Associate, Mr. H. W. Brewer, and his unique contributions to art by the pictorial representation of architecture. Mr. Brewer, he said, was a man of great research, and possessed of high imaginative powers. To younger men he was perhaps little more than a name, but to architects familiar with his work in the 'sixties and 'seventies of the last century he stood pre-eminent as a draughtsman of the highest order, and those who were acquainted with the illustrations in the pages of *The Builder* could look back to the splendid drawings he executed for that journal for more than forty years. He alluded to Mr. Brewer as a draughtsman of high quality, and especially to his knowledge of mediæval work, not only in this country, but also in France and Germany. He seemed in his interpretations of the great works of the mediæval masters to have caught the very spirit of the men who designed them. His imaginative powers were shown particularly in a panoramic view of Old London in the time of Henry VIII., published some fifteen years ago in *The Builder*. This was followed by a similar view of Old Paris, and others of a like nature. Mr. Brewer's death was a distinct loss, not only to them as an Honorary Associate, for he was elected only six years ago, but to the whole profession of Architecture. In the days when photography was in its infancy, and when the processes of reproduction so familiar to us now were unknown, Mr. Brewer's drawings as executed by himself on the wood were regarded as remarkable productions. Through the kindness of the editor of *The Builder*, Mr. Statham, and the proprietor of that journal, several had recently been exhibited in Catherine Street; but it would be very desirable, and would be greatly appreciated by members, if on some evening early in the Session, when there was a large gathering of students and younger men, Mr. Brewer's drawings and his powers of draughtsmanship were exhibited in that room. Mr. Graham concluded by moving

that a message of condolence be sent to the relatives of the deceased Honorary Associate, sympathising with them in the loss they had sustained, and expressing on the part of the Institute not only their sense of the great interest Mr. Brewer took in their art, but also the part he had taken in architectural progress during the last forty years.

Referring to the death of Dr. Corfield, another Honorary Associate of the Institute, the Hon. Secretary said that the name of Dr. Corfield was so familiar to them all, and the work he had done had been so fully recognised, that it was scarcely necessary for him to dilate upon it. Dr. Corfield was a pioneer in matters connected with hygiene, and those amongst them who had, either from choice or from necessity, to make a study of sanitary science had always found in Dr. Corfield a man who could assist and help them in every possible way. His labours were not only recognised here, but they met with full appreciation in foreign countries, and it was very satisfactory to them as a body to know that Dr. Corfield had worked with them as a friend and colleague for so many years. He asked the Meeting to accord to the memory of Dr. Corfield a similar expression of sympathy to that proposed with regard to their late friend Mr. Brewer.

The late James Martin Brooks [A.].

Mr. J. M. Brooks, whose death occurred recently at the age of fifty, was elected an Associate in 1881. He was the eldest son of James Brooks (*Royal Gold Medallist* 1895), with whom he entered into partnership, under the style of James Brooks & Son—afterwards James Brooks, Son & Godsell. Mr. Brooks made the designs for the three iron screens inserted between the arches that open into the Lady Chapel of St. Faith's Church, Stoke Newington, as a memorial to his father. He was architect of the new church at Sandford Hill, in Staffordshire, and for the restoration and enlargement of the fifteenth-century chapel of the Hospital of SS. Mary and Thomas of Canterbury, at Ilford.

REVIEWS.

ARCHITECTURE OF GREECE AND ROME.

The Architecture of Greece and Rome: A Sketch of its Historical Development. By the late William J. Anderson and R. Phené Spiers, F.S.A. 8s. Lond. 1902. Price 18s. net. [B. T. Batsford, 94, High Holborn.]

This book is just such an epitome of classic architecture as has been very much wanted both by amateurs and junior students for quite a number of years past.

Hitherto those in search of the more essential known facts relating to Greek and Roman architecture have had either to content themselves

with such scant crumbs of information as are to be found in those comprehensive sketches mis-called histories of architecture, or to laboriously glean what they wanted from a whole library of ponderous volumes, where it lies buried in masses of superfluous and irrelevant matter, and from a scarcely less voluminous mass of pamphlets and papers which, if more reliable, are often less accessible. This labour has now been undertaken for them by Messrs. Anderson and Spiers, and the result presented in an easily digested form, made the more palatable by an abundant seasoning of excellent and well-selected illustrations.

One of the most interesting sections of the book at the present time is that devoted to the "Mycenæan Age." It is an admirably clear and concise account of what was known of the architecture of that period at the time the chapter was written; and the reference on page 8 to the "Legend of Minos" should serve to place Mr. Anderson among the prophets. Dr. Evans's recent discoveries in Crete have made it desirable that this section should be somewhat enlarged in future editions; but the only correction required will be the omission of the passage which questions the inference from known, but not quite conclusive, examples that the wooden columns of the "Mycenæan Order" were of the table-leg type—smaller at the bottom than the top. This doubt was never very "philosophic," and would probably not have arisen but for the narrow pedantry of the late Mr. Fergusson, who could believe nothing but what squared with his own preconceived ideas. The attempt to make the Heræon at Olympia a witness in the case cannot have been very seriously meant. That temple must have been erected, at earliest, several centuries after Mycenæan civilisation had been destroyed, and we cannot even assume that the original wooden columns were necessarily of the same form as the stone ones that replaced them in still later times.

In dealing with the origins of the Doric Order, the authors seem to me to set aside, on rather insufficient grounds, the possibility of Egyptian columns—such as those in the Beni Hassan tombs—having been the prototypes of the Greek Doric form. The presence of the echinus in the latter, and the stunted proportions of the earlier examples, are no doubt difficulties; but they are not irreconcilable ones. On the other hand, it is as difficult to suppose that the rude Dorian conquerors brought an architecture with them from their northern mountain as that they developed so dissimilar a form as that of the Doric shaft from the columns of the "Mycenæan Order" which they found in the country.

There is no difficulty, it is true, in supposing that a fairly obvious form like the fluted shaft might be developed independently in two countries. But in this case the countries are known to have been in frequent, if not regular, communication.

The adventurous conquerors of Greece traded with Egypt and must have soon become acquainted with its buildings—solid structures of stone and granite, already venerable with age, which must have filled them with admiration. When, at the end of three or four centuries from their conquest, they had risen to such a state of civilisation that they themselves ventured to rear stone temples for their gods, they imitated, we know, to a large extent at any rate, the traditional wooden architecture of the country. But we know, too, that they did not imitate the form of the columns; it was a form that was obviously inapplicable to stone. Is it not, to say the least, more likely that in their difficulty they tried to imitate the stone columns of Egypt than that they were prepared with, or designed independently, a form in its main feature so similar? The probability would be even greater if, as has been more than once suggested, the first idea of building a stone temple was imported from Egypt, the source upon which every surrounding nation drew for much of its art.

The early history of the Ionic Order is still obscure, and will probably remain so until ancient sites in Asia Minor are more readily accessible for exploration. But there is matter enough for a moderate expansion of the very useful chapter on this subject. As it stands, it is chiefly valuable for a sensible and critical comparison of early capitals and for the note which points out the absurdity of calling the volute capitals of Persepolis "proto-Ionic," an absurdity for which Mr. Fergusson again was responsible, and which a mere comparison of well-authenticated dates should have exposed long ago.

In dealing with the curious temple at Bassæ, Mr. Spiers has for once allowed the interest of the subject to overcome his usual reserve and brevity; as well as the consideration that in a book of this kind it is the normal rather than the exceptional that should be dwelt upon. Yet one cannot regret the interesting and critical account given. The most strikingly useful point made is the apparently well-supported suggestion, new to most English readers, that the rimmed angle of a roof opening discovered by Professor Cockerell was the angle of one of a number of small openings, each confined to the area of a single tile, and not of a large one in the centre of the roof. Mr. Spiers seems to accept the suggestion conveyed in Cockerell's vignette of the interior; and to believe that the cella was ceiled with a segmental vault. Pausanias says pointedly that the temple was "built of stone, roof and all"; which appears to indicate something more unusual than marble tiles, which must have been familiar enough to travellers of his day. Yet a segmental vault does not fully explain the peculiarities of the plan; to do that it would have to be returned at the ends in dish form. And the fact that the many experts who have examined the site have all agreed in

saying there are no remains whatever of any cella ceiling (though fragments of the coffered ceilings of the porticos were found) seems fatal to any theory of a stone vault.

The efforts made by most modern authorities to reconcile known political and architectural facts with the statement of Pausanias, that this temple was built by Ictinus, the architect of the Parthenon, at the time of the Peloponnesian war, have to me much the air of apology to themselves for faith in the incredible. I am disposed to think that the late Mr. Watkiss Lloyd must have been right, and that it would be as easy to believe that the friezes of the two temples were the work of the same sculptor as that the temples themselves were designed by the same architect. Mr. Lloyd seems to have been considering mainly the proportions and details of the Doric peristyle, which he held to be of an earlier period; but there is quite as much difficulty in believing, either that the cella is of so early a date, or that an Athenian architect would have found employment at Phigalia during the Peloponnesian war. Pausanias is no doubt a more reliable guide than many of his contemporaries in matters which came under his own observation; but there is no reason for accepting implicitly his assignment of a particular ancient building to an architect who lived more than six centuries before his day, and who, as a celebrated exponent of his art, was probably credited with many more works than he actually had anything to do with.

In the part of the book devoted to Roman architecture the mixed geographical and chronological arrangement, which gives to the Greek section much of its clearness and interest, is abandoned for the customary classification of buildings according to their purpose. This is to be regretted; but it was perhaps inevitable, not only for the reason assigned, namely, that their purposes were so diverse, but even more because the chronology of Roman architecture has never been fully made out. It has never, like Greek and Mediæval architecture, been subjected to a careful examination directed to the discovery of its historical development. The dates of the first foundation of most of the great buildings of Rome under the Empire are well known to within a year or two. But it is still uncertain in most cases whether the existing remains belong to the original structure or to one of the innumerable subsequent restorations or rebuildings due to fires or to the policy or mere caprice of the emperors. This uncertainty was startlingly illustrated by the recent discovery that the existing Pantheon is built throughout of bricks stamped with dies of the time of Hadrian, and cannot possibly be, as was always supposed, the original Pantheon of Agrippa. As to the numerous, and, as a rule, better preserved structures in the Provinces, it is in most cases impossible to assign any date at

all to them with an approach to confidence. Another difficulty in the way of an historical treatment is the doubt every inquirer must feel whether anything more than a few fragments can be assigned to that important period in the development of Roman architecture when Greek influence was paramount; when Vitruvius was writing his book, and the Greek Ionic Order was apparently a fashion not yet superseded by the Corinthian; and when the system of modelling great buildings in concrete, and casing them with marble, stucco and mosaics, had not yet developed into the imperial Roman style, or, possibly, was not even thought of.

The chapters on Roman architecture show a similar breadth of view to those on Greek work, by including the principal examples and variations from all parts of the provinces; but they suffer in clearness and emphasis from excessive condensation. And one must regret that under such circumstances so much space is taken up by descriptions of a structure of so little architectural interest as the "Pont du Gard" and a detail of so little importance as the variations in the foliage of the Corinthian capital. The most welcome chapter is that devoted to a sketch of palatial and domestic architecture; but here again a sixth of the whole is given to a description of a "prix de Rome" restoration of Hadrian's villa, while such an important piece of evidence as the "marble plan" is not referred to at all. A point of considerable interest, especially to architects, is brought out on page 214, where it is shown that, in certain cases at any rate, the whole design of complicated buildings, including structural decorations, must have been thought out and arranged by the architects before the walls were built—a lifting of the veil which reveals a vision "working drawings."

There is evidence in various parts of the book of hasty preparation for the press. The Lycian tombs, to which a section of Chapter VI. is given, had already been described in Chapter III., and a long passage on page 50 is repeated, with a rather important alteration in dates, word for word, on page 52. There are also some obvious smaller errors, especially in technical terms derived from the Greek. In the glossary, and occasionally in the body of the work, the authors have bravely tried to improve our confused and unsatisfactory terminology of Classic architecture, but, unfortunately, with little success. Many definitions in the glossary are far from satisfactory; and such defiances of etymology as "epinaos" for "posticum," and "peristyle" for the portico on one side only of a building, cannot be necessary. In the list of books one wonders at such a slip as the attribution of *Mythology and Monuments of Ancient Athens* to "Margaret de Verrall. Translated by Jane E. Harrison," which is the more curious since, on page 117, it is attributed (more justly, if still inaccurately) to Miss Harrison only.

And why should that most useful of all general works on Greek and Roman antiquities, Dr. Wm. Smith's *Dictionary*, be omitted?

In conclusion: if I have been led by the interest of the subject to contest one or two conclusions and point out what I conceive to be errors, I am not the less conscious that the work is a very important and successful attempt to bring together within a moderate compass the most reliable and pertinent information available on the subject of Classic architecture. In particular I admire the strength of mind which has enabled the authors to confine themselves, on the whole, to a concise and ordered relation of facts, and to resist the temptation, which has overcome almost all other writers on the subject, to aim at literary grace—an attempt which usually ends in empty panegyric and loose and fanciful theories. This must have been determined by choice and not by lack of literary skill on Mr. Anderson's part, for the opening passages of the book are a particularly eloquent and persuasive piece of special pleading that brings home to one the loss architecture has sustained by the premature death of the writer.

FRANK BAGGALLAY.

COUNTRY HOUSES.

A Book of Country Houses. By Ernest Newton, Architect. Lond. 1903. Price 21s. net. [B. T. Batsford, 94 High Holborn, W.C.]

In view of the great number of publications dealing with buildings of the domestic class which have been issued in recent years, and the almost bewildering profusion of new houses, great and small, with which the countryside has during the last two or three prosperous decades been so liberally sprinkled, some courage must have been needed on the part of author and publisher to attempt this further venture, and one might feel inclined to look somewhat critically for the special reasons which could constitute the need for its publication.

No special justification is pleaded by the author, who disclaims the idea of putting forward his designs as "examples" to be copied, and merely offers the selection of plans and perspective views contained in his book as the fruit of his matured experience in building during the past ten years or so, and in the hope that they may prove suggestive to that section of the public who would be interested in the subject.

House-building is, however, a progressive art, and the *raison d'être* of the present work must be sought in the fact that it presents a phase of modern practice which marks a distinct and undeniable advance upon much that immediately preceded it, since its objects are purity of principle in use of material, and a recognition of the paramount value of practical common-sense, comfort, and convenience in planning, and the evolution on these lines of a simple and natural architecture.

It is to be hoped that we are permanently growing out of the weakness for over-elaborate and fussy detail which has been so marked a failing of modern days, and that a refined simplicity may become more and more the rule. To this end Mr. Newton's work has doubtless contributed in no small degree, and a careful study of the present volume will tend to spread the conviction that the simplest elements of form, when skilfully blended, are capable of yielding the most durable satisfaction.

The works illustrated are of very varied character, with great diversity of plan, and the elevations range from a quite rustic appearance to a certain degree of stateliness. All are marked, however, by the same commendable restraint in detail which is the keynote of the work. The quiet charm of manner which is the outcome of this is strikingly exemplified in House No. 10 (Plate XXXIII.).

No. 11 is restful and pleasing, Venetian shutters being introduced with good effect. No. 9 is worthy of note from the clever and effective grouping shown in Plate XXVIII.

No. 14, with its range of semi-octagonal bays and the bold cornice broken around them, has a decidedly good effect, but the *tout ensemble* seems rather marred by the gabled dormers with their weather-boarded fronts. No. 19 is also very good.

A few, such as No. 15 (Plate XLIX.), are less happy in conception, and Nos. 1 (Plate I.) and 5 (Plate XIII.) exhibit a mannerism in the gables and cornice which is unfortunate.

The plans do not call for criticism. They are without exception well arranged and economical, and should make most comfortable houses. They are clearly reproduced. The photographic reproductions and black-and-white drawings are also good, and the latter are so drawn as to exhibit as clearly as possible the nature of the material employed.

Bristol.

FRED. BLIGH BOND.

LEGAL REGISTRATION OF ARCHITECTS.

19 Craven Street, Strand, W.C., 22nd October 1903.

To the Editor of the JOURNAL of the ROYAL INSTITUTE of BRITISH ARCHITECTS.

SIR,—The majority of the clauses of the Architects' Registration Bill, to which I have made no direct reference in my previous letters upon this subject, deal with the admission of colonial and foreign practitioners to the register under proper restrictions. That such provision would be necessary is obvious, and in a general way the Medical Act has been followed, while there is no need, perhaps, at the present time to go into this matter in detail.

More important to most of us would be the

prohibitory clauses. After the passing of the measure none but registered practitioners would be entitled to describe themselves as architects, using the title either alone or in combination with other words—except in the case of naval architects—under severe monetary penalties.

This is strengthened by precluding any but registered practitioners from the right to recover charges for professional services rendered in the capacity of an architect; or from holding public appointments involving either the performance of work as an architect or the examination and approval of plans for building work. The present holders of such appointments are necessarily excepted, however, and members of the Institution of Civil Engineers, and Fellows and Professional Associates of the Surveyors' Institution, are allowed to be appointed to such posts on producing certain certificates of competency.

Even more searching is Section 30, which would render invalid any certificate given in accordance with any Act of Parliament by such an officer unless he were a registered practitioner.

Certain penalties are necessarily introduced to enable the Bill to be enforced; and its final sections are devoted to constituting the Privy Council as a court of appeal in case of necessity.

Yours, &c.,

G. A. T. MIDDLETON.

MINUTES. I.

At the First General Meeting (Ordinary) of the Session 1903-04, held Monday, 2nd November 1903, at 8 p.m., Mr. Aston Webb, R.A., F.S.A., *President*, in the chair—Present: 55 Fellows (including 18 members of the Council), 38 Associates (including 3 members of the Council), 4 Hon. Associates, and numerous visitors: the Minutes of the Meeting held 22nd July 1903 [*JOURNAL*, No. 16, Vol. X.] were taken as read and signed as correct.

The following Fellows, attending for the first time since their election, were formally admitted and signed the register—viz. Henry Jones Lanchester, Harry Redfern, and Henry Whiteman Rising.

The Hon. Secretary announced the decease of the following members:—Henry William Brewer and Professor William Henry Corfield, M.D., *Hon. Associates*; Herbert Ford, *Fellow*; Arthur Job Barlow and James Martin Brooks, *Associates*. The Hon. Secretary having made some observations appreciative of the work of the late Mr. H. W. Brewer, moved, and the Meeting thereupon

RESOLVED, That a message of condolence be sent to the relatives of the late Henry William Brewer, *Hon. Associate*, sympathising with them in the loss

they had sustained, and expressing on the part of the Institute not only their sense of the great interest Mr. Brewer took in their Art, but also the part he had taken in architectural progress during the last forty years.

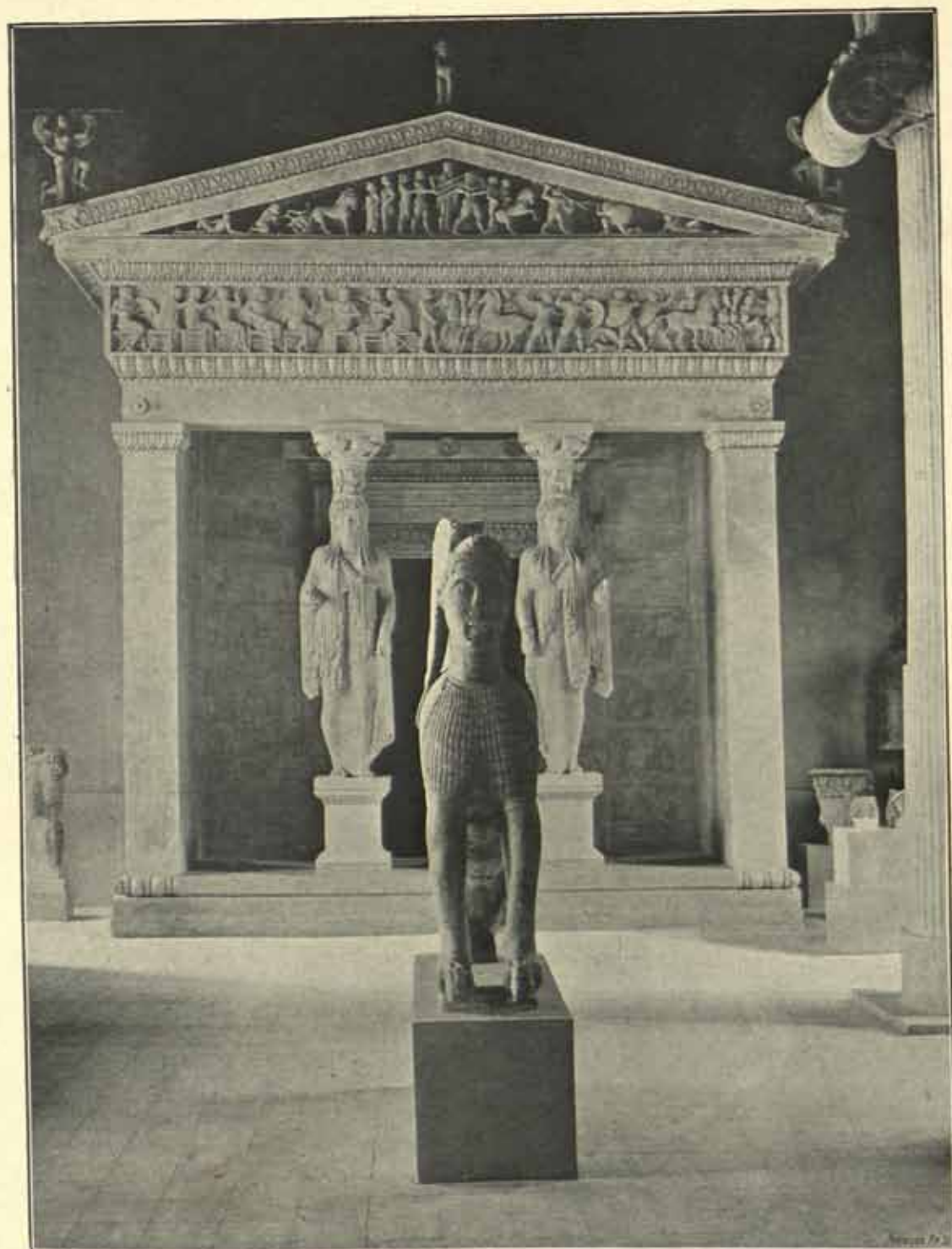
A similar expression of sympathy and regret at the death of Dr. Corfield was also ordered to be entered on the Minutes [p. 24].

The Secretary announced the names of the successful candidates in the recent Statutory Examinations held by the Institute [p. 23].

The following candidates for membership, found by the Council to be eligible and qualified according to the Charter and By-laws, were recommended for election:—As FELLOWS, Llewellyn Kitchen [A.] (Hull); Brook Taylor Kitchen, Architect to the Local Government Board; Sydney Perks, P.A.S.I. [A.]; Basil Alfred Slade; Melville Seth Ward. As ASSOCIATES, Edward Percy Arober (*Probationer* 1897, *Student* 1901, *Qualified* 1903); Ormrod Maxwell Ayrton (*Special Examination* 1903); Henry Arthur Battley (*Probationer* 1894, *Student* 1895, *Qualified* 1903); Thomas James Bee (*Probationer* 1894, *Student* 1898, *Qualified* 1903) (Sidecup); Harry Thomas Bill (*Probationer* 1898, *Student* 1899, *Qualified* 1903) (Birmingham); Herbert Black (*Probationer* 1900, *Student* 1901, *Qualified* 1903) (Cape Town, S. Africa); Guy Church (*Probationer* 1898, *Student* 1900, *Qualified* 1903); John Daniel Clarke (*Probationer* 1897, *Student* 1902, *Qualified* 1903); William Edward Couch (*Probationer* 1897, *Student* 1899, *Qualified* 1903); Percy Boothroyd Dannatt (*Probationer* 1897, *Student* 1901, *Qualified* 1903); Henry Edmund Davey (*Probationer* 1892, *Student* 1894, *Qualified* 1903); Robert Robb Gall (*Probationer* 1898, *Student* 1899, *Qualified* 1903) (Aberdeen); Jordan Green (*Probationer* 1900, *Student* 1901, *Qualified* 1903) (Birmingham); Thomas Frank Green (*Probationer* 1893, *Student* 1898, *Qualified* 1903); Ernest Martin Joseph (*Probationer* 1899, *Student* 1899, *Qualified* 1903); Albert Edward Lacey (*Probationer* 1895, *Student* 1898, *Qualified* 1903) (Ashford, Kent); Thomas Edgar Richards (*Probationer* 1900, *Student* 1902, *Qualified* 1903) (Barry, S. Wales); Tom Simpson (*Special Examination*, 1903); Harold Bayldon Smith (*Probationer* 1896, *Student* 1902, *Qualified* 1903) (Port Elizabeth, S. Africa); George Walker (*Probationer* 1897, *Student* 1898, *Qualified* 1903); Septimus Warwick (*Probationer* 1897, *Student* 1902, *Qualified* 1903); Richard Wylie (*Probationer* 1900, *Student* 1901, *Qualified* 1903) (Gateshead). As HON. ASSOCIATES, Lord Balcarras, M.P., F.S.A., Junior Lord of the Treasury; The Right Hon. Lord Windsor, P.C., D.L., First Commissioner of His Majesty's Works. As HON. CORRESPONDING MEMBER, Charles Follen McKim, President of the American Institute of Architects, *Royal Gold Medallist* 1903.

THE OPENING ADDRESS OF THE SESSION having been delivered by the President, the subject-matter thereof was discussed by the Right Hon. Lord Windsor, P.C., Mr. H. T. Hare [F.], and Mr. Reginald Blomfield, M.A., whereupon, on the motion of Lord Windsor, seconded by Mr. Hare, a vote of thanks was accorded the President by acclamation.

The proceedings then closed, and the Meeting separated at 10 p.m.



DELPHES.—TRÉSOR DES CNIDIENS: FAÇADE OCCIDENTALE RESTAURÉE.



FIG. 1.—VUE DU TRÉSOR DE CNIDE, PRISE DU SUD; ÉTAT ACTUEL.

LE TRÉSOR DE CNIDE, ET LES MONUMENTS DE L'ART IONIEN À DELPHES.

Par J. T. HOMOLLE [*Hon. Corr. M.*],

MEMBRE DE L'INSTITUT DE FRANCE, DIRECTEUR DE L'ÉCOLE FRANÇAISE D'ATHÈNES.

Read before the Royal Institute of British Architects, Monday, 16th November 1903.

V EUILLEZ permettre que ma première parole dans cet Institut soit un souvenir et un hommage à la mémoire de l'illustre Penrose, dont l'affectueux patronage m'en a ouvert l'entrée. J'ai eu l'honneur de le connaître en Grèce, dans sa robuste vieillesse que l'âge semblait ne point toucher, pas plus qu'il ne refroidissait l'enthousiasme de son cœur, sa foi dans l'art et sa passion pour la vérité. Je le vois encore plein de feu, l'œil brillant et le geste animé, quand il conversait des beautés de l'architecture antique. Alerté et gai comme un étudiant, il courait la Grèce à dos de mulet, gravissait les montagnes, bravait les journées de soleil et les nuits de Khani, pour contrôler une mesure ou déterminer l'orientation d'un temple. Le nom de Penrose est attaché au Parthénon; il durera aussi longtemps que sera goûtée et étudiée cette merveille de l'art; nul n'en a pénétré ses secrètes délicatesses avec plus de conscience et de sagacité, nul n'a plus contribué par ses adjurations pressantes et son ingéniosité pleine de ressources à conserver à l'humanité les restes admirables de cet édifice. Il l'a aimé fidèlement pendant plus de cinquante années, et, jusqu'à sa dernière heure, le sentant menacé de ruine, il en fit l'objet de sa sollicitude. Ce dont se souviendront

aussi tous ceux qui ont eu, comme moi, la bonne fortune de l'approcher, c'est sa bonté si simple, si accueillante, et cette affabilité dont le charme était rendu plus touchant encore par sa couronne de cheveux blancs. Excusez-moi, Mesdames et Messieurs, de n'avoir pu vous cacher le chagrin que j'éprouve à ne plus rencontrer ici son sourire amical et sa cordiale bienvenue.

Pour vous, Messieurs les Membres de l'Institut, qui m'avez fait votre confrère, je suis heureux de vous renouveler devant cette brillante assemblée mes remerciements reconnaissants ; j'ai contracté envers vous une dette que je voudrais pouvoir acquitter ; mais je crains bien, au contraire, d'en contracter une seconde, quand vous me conviez à parler dans cette salle, devant vous, après d'illustres maîtres de la science et de l'art.

J'aurais voulu répondre beaucoup plus tôt à votre invitation, je vous demande pardon du retard, j'oserais dire pourtant que je ne le regrette point, puisque ces délais ont laissé se dissiper les fâcheux malentendus qui avaient pour un temps trop long séparé nos deux pays, et qu'il m'est permis aujourd'hui de m'abandonner sans la moindre arrière pensée à l'admiration profonde que j'éprouve, avec tous les amis de la paix et de la liberté, pour ce grand et noble pays.

L'honneur que vous m'avez fait ne s'adresse pas à moi seul, c'est surtout un hommage rendu à l'œuvre accomplie dans le sanctuaire de Delphes par l'Ecole Française d'Athènes et à laquelle j'ai eu le bonheur de présider ; c'est donc, si vous le voulez bien, des découvertes de Delphes que je vous entretiendrai aujourd'hui.

Le sujet est trop riche pour être exposé en son entier et j'ai dû choisir parmi les monuments qui sont sortis du sol, celui qui m'a paru le plus digne de vous être présenté : c'est le *Trésor de Cnide*. Aucun n'est plus original, plus complètement conservé en ses éléments essentiels, aucun enfin ne m'a paru plus approprié à cette chaire et à cette ville. Vos architectes et vos archéologues ont réuni dans le British Museum une incomparable série de monuments de l'art gréco-asiatique ; ils les ont interprétés et restaurés avec une pénétration singulière et un remarquable talent ; j'ai pensé que vous accueilliriez volontiers un spécimen achevé de l'architecture ionienne du sixième siècle avant notre ère.

Je me propose 1° de le décrire et de le restituer devant vous, par l'analyse et l'assemblage des morceaux qui nous en restent ;

2° d'étudier la riche décoration, qui en est le plus frappant caractère et le plus original ;

3° de marquer la place de ce monument dans l'histoire de l'art, et celle de l'ionisme lui-même dans l'histoire de l'antiquité.

Toutefois il ne sera pas inutile, ce me semble, pour replacer le Trésor en son milieu, de décrire le plus brièvement possible, l'ensemble du sanctuaire de Delphes, et d'indiquer au moins en quelques mots, l'abondance et la variété des monuments et des offrandes qui se pressaient à l'entour. Ce sera justice envers mon architecte, M. Tournaire, dont vous voyez ici exposés les magnifiques dessins, de vous expliquer ces plans et ces restaurations, et j'ai peut-être aussi à l'égard de mes collaborateurs et du gouvernement Français lui-même le devoir de vous faire connaître l'importance de notre œuvre et la grandeur de notre effort.

Les fouilles de Delphes ont été concédées à la France, en vertu d'une convention diplomatique, ratifiée par les parlements français et hellénique en 1891 ; elles ont été préparées par l'expropriation totale du village de Castri, établi sur le site de Delphes, qui n'ont pas demandé moins de deux années ; car elles portaient sur un pays de mille habitants environ, sur quatre cents maisons et près de huit cents parcelles. Cette opération à elle seule a exigé une dépense de 268,000 f. ; la somme totale des crédits extraordinaires votés par les chambres françaises de 1891 à 1896 a été de 790,000 f., et il y faut encore ajouter les crédits normaux du budget de l'Ecole Française d'Athènes, qui depuis 1897 ont été affectés à l'entreprise de

Delphes. On a employé jusqu'à 400 ouvriers, 72 wagons Décauville et plusieurs kilomètres de voie ferrée; les déblais atteignent et dépassent même 400,000 mètres cubes. Les recherches se sont étendues du village actuel de Delphes jusqu'aux environs de la source de Képhaloorysi, sur une longueur de plus de deux kilomètres, elles ont porté non seulement sur le temple et

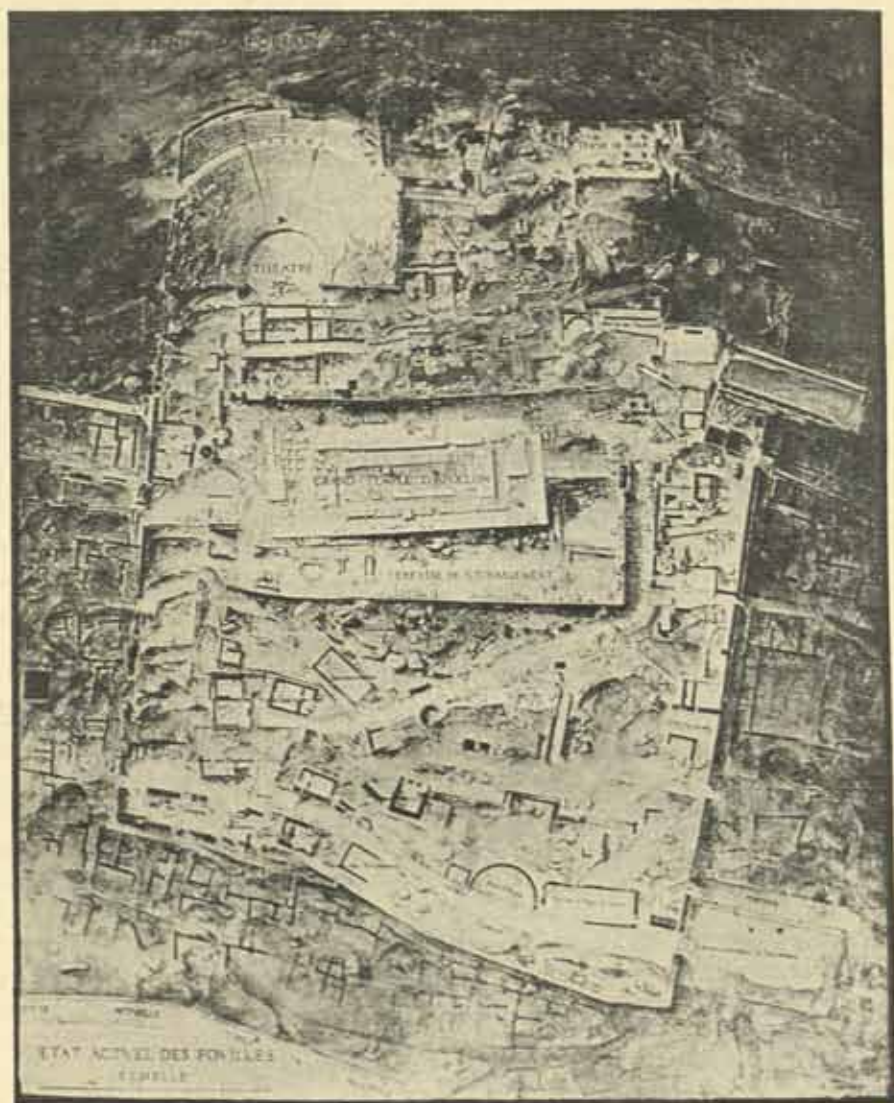


FIG. 2.

toute l'enceinte consacrée à Apollon Delphien, dont vous avez sous les yeux l'image, mais encore sur toutes les dépendances du sanctuaire: le stade, la célèbre fontaine de Castalie, le gymnase, les temples compris dans l'enceinte d'Athéna Pronæa, groupe d'édifices d'une rare élégance, dans un site poétique et charmant. Dans tout ce vaste périmètre, les recherches ne se sont arrêtées qu'au sol vierge et nous avons encore exploré, à l'est et à l'ouest du sanctuaire, une partie des anciens faubourgs et les deux nécropoles qui bordaient les routes.

Si, nous enfermant dans les limites de l'enceinte sacrée, vous voulez bien parcourir avec moi, sur le plan [fig. 2], l'élévation en état actuel et l'élévation restaurée, dessinées par M. Tournaire, la voie sacrée qui serpente en lacet sur les pentes de la montagne de Delphes, de la porte au temple d'Apollon, du temple au théâtre, à la fontaine inspiratrice de Cassotis et à la Leshé de Cnide, vous rencontrerez tour à tour les offrandes énumérées par Pausanias, quelques-unes mêmes, et ce ne sont pas les moins belles, qu'il avait omises ou trop négligemment décrites. Voici, dès l'entrée, le taureau de Coreyre, les ex-voto des Arcadiens, des Argiens, des Tarentins et, face à face, continuant jusque dans le sanctuaire l'antagonisme des deux peuples rivaux, le trophée des Athéniens vainqueurs à Marathon, et celui des Spartiates vainqueurs des Athéniens à Aegos-Potamos. Puis commence la série des trésors, serrés au carrefour de la voie sacrée, au voisinage du vieux sanctuaire prophétique de la Terre et des Muses, trésors de Corinthe et de Sicyone, de Siphnos et de Cnide, de Thèbes, de Syracuse, de Potidée, d'Athènes, de Cyrène, peut-être de Clazomène. Sur la haute et puissante terrasse que forme le mur polygonal, repose le temple, dominant de sa masse le sanctuaire et toute la vallée. Autour de lui se dressent, au sommet d'une colonne ionique le Sphinx de Naxos, sur une haute tige d'acanthé le chœur gracieux des Caryatides, sur une haute base triangulaire, la Victoire offrande des Messéniens, réplique de celle d'Olympie; tout près enfin du grand autel des sacrifices, le trépied de Platées et la Victoire d'or consacrée par Gélon de Syracuse, ex-votos des deux grandes victoires des Grecs sur les ennemis de la civilisation hellénique, les Perses et les Carthaginois. En regardant ces monuments, il semble que l'on y lise toute l'histoire de l'antiquité. Les sculptures, les bronzes, les offrandes de tout genre, nous montrent à leur tour le développement des industries et de l'art, depuis l'époque mycénienne jusqu'à celle de Rome et de Byzance même; et quelques-unes de nos découvertes, comme les sculptures du Trésor de Cnide, comme les métopes du Trésor d'Athènes, ou celles du temple rond de Marmaria, comme l'Agias de Lysippe, ou l'admirable conducteur de char, don du syracusain Polyzalos, sont de véritables chefs-d'œuvre et des documents capitaux pour l'étude de la plastique ancienne. Les inscriptions dépassent de bien loin le millier.

Comblés par la fortune de tant de faveurs, nous avons eu conscience de nos devoirs envers la Grèce et les savants du monde entier. Après avoir exhumé les monuments, nous étions tenus d'en assurer la conservation, d'en faciliter l'accès, d'en rendre l'intelligence aisée aux amateurs, comme aux savants. Grâce à la libéralité de feu Syngros et de Madame Iphigénie Syngros, sa veuve, nous avons pu installer à l'aise dans un grand et clair musée les statues, bas-reliefs, bronzes, terres cuites, inscriptions et morceaux d'architecture. Sur le terrain même, nous avons rassemblé les débris épars et relevé les ruines toutes les fois que la chose a été possible; en ce moment même, avec le concours généreux de la municipalité d'Athènes, nous reconstituons, pierre par pierre, des soubassements au faite, le trésor de cette ville, trophée de la victoire de Marathon. Quand la restauration n'était pas possible en original, nous l'avons faite en moulages, afin de parler aux yeux et de replacer les œuvres d'art dans les conditions où leurs auteurs avaient entendu qu'elles fussent vues. Ainsi avons-nous fait dans le Musée de Delphes pour le Trésor de Cnide, qui se dresse aujourd'hui dans toute la splendeur de son décor, avec ses frises, son fronton, ses acrotères, ses caryatides enfin, habilement restaurées par le sculpteur Louis Convers.

Le Trésor de Cnide a la forme d'un petit temple de 8 mètres 90 sur 6m. 30; il se compose d'une petite cella carrée précédée d'un prodomos, tourné du côté de l'ouest; on y accède par une petite terrasse que soutient un mur polygonal. Il est assis sur le mur d'enceinte, au bord et à la première boucle de la voie sacrée, dans une situation favorable pour être vu de tout côté. La photographie [fig. 1] le reproduit tel qu'il existe aujourd'hui, réduit à des soubassements, qui portent à peine quelques fragments de l'ancien édifice; si j'en rapprochais

brusquement la restauration qui orne aujourd'hui le Musée de Delphes [*v. frontispiece*] vous seriez en droit d'être surpris et presque de douter d'une transformation si complète et en apparence peu justifiée.

Je vous demanderai donc la permission, de démonter le monument pièce à pièce et de le remonter ensuite devant vous, en vous décrivant chacune d'elles et en vous montrant par quels liens nécessaires elles sont évidemment et inséparablement unies l'une à l'autre.

Nous commencerons par l'entablement, dont les divers parties nous sont arrivées les plus complètes et dont l'ajustement est le plus manifeste. Il comporte d'abord une architrave, qui se



FIG. 3.—ANGLE DU LAURIER.



FIG. 4.—GARGOUILLE DU CHÊNEAU SUR LA FAÇADE LATÉRALE.



FIG. 5.—ANGLE DU CHÊNEAU, AU-DESSUS DU FRONTON.



FIG. 6.—ANGLE SUPÉRIEUR DU CHÊNEAU AU-DESSUS DU FRONTON.

présente à nous sous deux formes : l'une pour la façade principale plus épaisse, puisqu'elle avait à soutenir dans l'intervalle des colonnes le poids du fronton, l'autre moins élevée, réduite à la hauteur des assises courantes pour les façades latérales, qui étaient pleines ; toutes deux portent au sommet un chapelet de perles et l'architrave de la façade principale est en outre décorée aux angles de fleurons. Au-dessus régnait une frise, sculptée sur les quatre faces, encadrée en haut et en bas par des rais de cœur et des oves, trouvés en abondance autour du monument avec la frise elle-même, mais dont les proportions sont si peu d'accord, semble-t-il, avec les dimensions du monument et les types de l'architecture ionique classique, qu'on eût hésité à risquer l'assemblage, si l'on n'en avait constaté la preuve manifeste. Cette preuve consiste dans les traces laissées au-dessous de la plinthe de la frise par les rondeurs des oves, et dans

des entailles qui entament les rais de cœur (avec cette liberté dont les Grecs étaient coutumiers), pour donner place aux cimiers des casques de deux guerriers combattant dans la frise.

Sur la frise ainsi encadrée reposent les larmiers dont la face inférieure est richement décorée de rinceaux, de palmettes et de fleurs de lotus [fig. 3]; un larmier semblable court tout le long du rampant du fronton. Le fronton lui-même, divisé en trois pièces et tout rempli de figures sculptées, a été retrouvé au pied des fondations, comme aussi le chéneau qui surmontait les larmiers sur les façades latérales [fig. 4] et au-dessus du fronton [figs. 5 et 6], les sphinx et les victoires ailées qui en couronnaient le sommet et les angles.

Ainsi nous arrivons sans une solution de continuité de l'architrave jusqu'au faite.

Passons maintenant au socle du monument; il nous est possible de le restaurer en partie soit avec des morceaux qui lui appartiennent en propre, soit sur le modèle d'un autre monument similaire, le Trésor de Phocée. Les pièces originales nous donnent le degré qui porte la dédicace du monument et une des pierres terminales du pilier d'ante; le Trésor de Phocée nous fournit le chapiteau de ce même pilier, d'une largeur identique et avec un décor de rais de cœur tout semblable à celui de la frise; il nous indique aussi la place qui doit être attribuée



FIG. 7.—ENCADREMENT DE LA PORTE.

au-dessus du degré à inscription, sous les antes et tout autour du monument sauf la façade occidentale, à un chapelet de perles de forte dimension et qu'on n'aurait su autrement où placer.

Il nous reste maintenant à reconstituer la façade principale du monument et à en calculer la hauteur. Nous avons pu le faire avec certitude en recomposant, à l'aide de fragments épars, une figure de caryatide en posant sur sa tête une petite base ronde, considérée jusqu'ici comme un petit autel et qui était en réalité un polos, parfaitement adapté à la tête de cette figure; en plaçant enfin au-dessus du polos un chapiteau en forme de calathos concordant exactement avec lui par le diamètre et la disposition du scellement. L'abaque de ce chapiteau est égal en largeur et en hauteur à l'abaque du chapiteau d'ante et démontre l'attribution de la caryatide au monument. La figure était placée sur une base composée d'un dé de marbre, pourvu en haut et en bas de deux tenons qui s'emboîtaient dans les mortaises appropriées de deux pièces de marbre moulurées en forme d'ovés et de rais de cœur, et qui formaient, l'une le socle, l'autre la corniche de la base. La largeur du dé est égale à celle du pilier d'ante, la largeur du socle et de la corniche est égale à celle de l'abaque du chapiteau. La base est elle-même, dans son ensemble, toute pareille à l'autel figuré sur le côté sud de la frise; elle est donc bien conforme au style du Trésor. Ainsi se trouvent reliés entre eux, par des liens indissolubles, le socle, la figure, et l'un et l'autre avec le monument; ainsi nous est donnée également la hauteur de l'édifice entre le degré et l'architrave.

On peut dès lors considérer comme achevée et démontrée la restauration du Trésor, telle qu'elle est exécutée dans le musée de Delphes [*v. frontispiece*].

Une des particularités les plus frappantes du Trésor c'est la richesse, on pourrait presque

dire la surcharge, de la dédicace ; la sculpture s'y prodigue sous forme d'ornements, de statues et de bas-reliefs sur toutes les moulures, sur toutes les surfaces du monument où elle a pu trouver place.

Le décor proprement architectural se ramène à trois types : chapelets de perles, oves, rais de cœur, sur les moulures ; rinceaux de palmettes et boutons de lotus, fleurons, sur les surfaces unies ; mais ces motifs, en petit nombre, sont variés par l'adaptation ingénieuse qui en est faite à chacun des morceaux où ils s'appliquent ; ils s'allongent, se raccourcissent, s'élargissent ou se resserrent, se simplifient ou se compliquent, se gonflent ou s'évident, avec une souplesse merveilleuse, un sentiment délicat des nuances, une appropriation intelligente.

Il ne nous reste plus que la porte : la belle pièce du linteau [fig. 7] décoré de rinceaux et de chapelets nous en fait connaître l'aspect ; la console a conservé le dessin de la moulure qui



FIG. 8.—FRISE DE L'OUEST : L'APOTHÉOSE D'HERCULE.

la surmontait, du larmier orné en avant de rosaces, au-dessous de palmettes et de boutons de lotus qui lui servait de couronnement, et nous en pouvons calculer très approximativement la hauteur et la largeur à l'espace à occuper ou à l'effet à produire. Ce qui se soutient partout avec une égalité admirable, c'est la perfection rare de l'exécution précise sans sécheresse, ni maigreur, ample au contraire, vigoureuse et même un peu lourde, mais d'une magnifique richesse.

Le décor sculptural a les mêmes qualités de prodigalité somptueuse, d'élégance, de force, d'exécution. Il comporte d'abord une frise sculptée qui se continue sur les quatre faces, et se partage en quatre sujets.

Sur la façade occidentale, au dehors du prodomos, l'apothéose d'Hercule ; le héros est introduit dans l'Olympe par Athéna portée sur un char attelé de chevaux ailés et ailée elle-même, tandis qu'au bord opposé Hébé entre aussi dans l'assemblée des dieux en descendant de son char [fig. 8].

Sur la face sud, l'enlèvement des filles de Leukippos par les Dioscures. Auprès de l'autel où se célébraient les fiançailles des jeunes filles, le père monte sur son char et s'élance à la poursuite des ravisseurs. Trois chars précédés et suivis de cavaliers semblent comme un premier essai du défilé des Panathénées sur le Parthénon [fig. 9].

Sur la face est (elle est reproduite au complet et restaurée dans la restitution de la façade de l'ouest, comme étant la mieux conservée), le combat des Grecs et des Troyens autour du corps d'Euphorbos, sous les yeux des dieux assemblés dans l'Olympe, qui suivent avec émotion les péripéties de la lutte et encouragent chacun les guerriers de leur peuple favori. Cette assemblée des dieux à son tour rappelle une scène analogue sur la frise du Parthénon, une conversation des dieux suivant les cérémonies de la fête célébrée en l'honneur d'Athéna [fig. 10].

Sur la face nord, le combat des dieux et des géants, ce sujet que la sculpture grecque répéta sans se lasser depuis le septième siècle avant notre ère jusqu'à l'époque des Attalides de Pergame [fig. 11].

Pour le style et la technique les bas-reliefs forment deux à deux des séries différentes et attribuables à deux artistes différents au moins. La facture très serrée, très soignée y est partout archaïque, sèche, mais les contours sont cependant beaucoup plus durs, le modelé



FIG. 9.—FRISE DU SUD : L'ENLÈVEMENT DES FILLES DE LEUKIPION.

beaucoup plus sommaire dans les frises de l'ouest et du sud, plus orné et plus arrondi, plus fondu dans les deux autres.

La composition est soumise à des lois rigoureuses de symétrie ; les figures se distribuent autour des motifs principaux en nombre égal et dans des attitudes analogues et inverses. Elle manque parfois gauchement aux lois de l'unité, coupant en deux moitiés égales et indépendantes un des côtés de la frise (le combat des Grecs et l'assemblée des dieux).

J'ai désigné jusqu'ici le monument que nous étudions ensemble sous le nom du Trésor de Cnide ; cette appellation doit être justifiée d'autant mieux qu'elle n'a pas été adoptée dès l'abord, qu'elle est contestée encore aujourd'hui par quelques archéologues. Le Trésor de Cnide se cache en quelque sorte sous une allusion dans un chapitre de Pausanias, tandis que le Trésor de Siphnos s'y étale en pleine clarté, et j'avais moi-même subi d'abord l'illusion. Un examen plus attentif du texte m'a montré que le Trésor de Cnide était immédiatement contigu à celui de Sicyone, et qu'il répond par conséquent aux dessins du plan de Delphes. Celui de Siphnos venait ensuite, soit plus loin à l'ouest, soit en face au nord sur le bord opposé de la route. L'existence du Trésor de Cnide est démontrée par deux espèces d'inscriptions : 1° la dédicace gravée sur le degré du trésor, en un alphabet que nous savons par des inscriptions de Naukratis avoir été celui de Cnide ; 2° des décrets gravés sur la face

antérieure de l'ante, et qui avaient été rendus par la ville de Delphes en faveur de personnages cnidiens, bienfaiteurs du sanctuaire et hôtes publics de Delphes.

Vous sentez, Mesdames et Messieurs, qu'elle est l'importance de cette conclusion : le monument est donc l'offrande et l'œuvre d'une ville d'Asie, d'une cité ionienne, d'une de celles qui avaient porté le plus loin au dehors leur activité commerciale, qui avaient participé à la fondation du comptoir de Naucratis, dont la curiosité s'était excitée au spectacle suggestif des civilisations antiques de l'orient et en particulier de l'Égypte, dont l'art avait reçu l'impulsion et rapporté les modèles de l'étranger. Nous savons donc la provenance du monument, et quand nous reconnaitrons dans le type du décor, dans le style de la sculpture, les inventions et la force de l'art gréco-oriental, de l'art ionien pour l'appeler par son nom, nous ne ferons pas une vaine hypothèse, nous ne risquerons pas d'être le jouet d'appréciations subjectives ; nous constaterons un fait évident par des évidences matérielles.

Par Ionie, quand on parle de l'art ionien, il ne faut pas entendre d'ailleurs strictement, vous le savez, la région peuplée par les colonies premières ioniennes, le pays d'Ephèse, de Milet, des Magnésiens, mais toute la côte asiatique occupée par les Hellènes, à quelque branche de la famille qu'ils appartiennent, du golfe d'Adramytte jusqu'à Rhodes.

Parlant ici, à quelques centaines de mètres du British Museum, je n'ai pas besoin d'insister longtemps. Je n'ai qu'à vous rappeler vos souvenirs. Dans la richesse somptueuse, un peu exubérante, de la décoration, dans la rondeur un peu lourde de la sculpture, dans l'élégance recherchée des ajustements, la vigueur des formes un peu courtes, des modèles durement ressentis, des contours sèchement découpés, vous avez reconnu les défauts comme les qualités des sculptures monumentales d'Ephèse, de l'Avenue des Branchides à Milet, du monument des Harpyes ou des Néréides à Xanthos. C'est la même puissance, la même fougue d'invention, c'est la même habileté rare d'exécution, avec je ne sais quoi d'outré, d'excessif, qui est dans l'art comme dans la rhétorique la marque propre d'un génie ionien ou asiatique, volontiers excessif, et déclamatoire. Le Trésor de Cnide n'est pas seulement un édifice de provenance ionienne, il est de travail ionien, il est ionien d'esprit. Et ces dons mêlés de force intempérante, de goût mal réglé, de puissance originale, mais immodérée, forment si bien le fonds permanent de l'art ionien qu'ils reparaissent à toutes les époques, qu'ils éclatent, si j'ose dire, avec force dans les compositions des périodes hellénistiques, dans les sculptures décoratives de Priène, dans les colossales machines des écoles de Rhodes ou de Tralles, dans la Gigantomachie de Pergame. Je me bornerai à deux rapprochements empruntés à des monuments beaucoup plus simples mais peut-être d'autant plus typiques ; deux sarcophages, œuvres moins rares, plus soumises par conséquent aux



FIG. 10.—PRIÈNE DE L'ÉNT : L'ASSEMBLÉE DES DIEUX.

habitudes usuelles de la pensée et de l'art. Sur le sarcophage de Clazomènes qui est un des ornements de votre musée, comme sur celui d'Alexandre, qui fait la richesse de celui de Constantinople, vous retrouverez le même décor d'oves et de rais de cœur, formant en haut et en bas la composition, et ce décor y est, comme dans le Trésor de Cnide, hors de proportion avec la sculpture qu'il resserre un peu dans son cadre; tout au moins il dépasse la mesure à laquelle nous sommes habitués et qui nous paraît la plus juste; sur les côtés c'est le même listel indiqué par une ligne dans la peinture, par un relief dans la sculpture qui limite et encadre le champ, ainsi que nous le voyons encore dans les bas-reliefs lyciens ou celui du monument des Harpyes. La composition et les formes sont tellement semblables dans le sarcophage de Clazomènes et le Trésor de Cnide, qu'on croirait que l'apothéose d'Hercule entre le char d'Athéna et celui d'Hébé, et le combat auquel prennent part deux déesses descendant le leur char, ont été conçus et exécutés dans un même atelier. On ne peut s'attendre à l'identité de deux œuvres aussi éloignées dans le temps que la chasse d'Alexandre et les combats du Trésor de Cnide, mais on n'aurait pas de peine à y retrouver le même esprit.

Le Trésor de Cnide, s'il était isolé parmi les monuments de Delphes et unique en son genre, aurait déjà, Mesdames et Messieurs, une importance considérable et par sa propre valeur d'art, et comme représentant un art gréco-oriental; entouré, comme il l'est, d'autres offrandes des villes de l'Ionie et des îles, d'autres édifices bâtis dans le même temps, dans le même style, suivant les mêmes principes, parfois imités ou copiés sur lui, il prend une signification historique bien plus haute, bien plus large encore.

Et d'abord la ville de Cnide elle-même avait consacré dans Delphes au point le plus haut du sanctuaire, à l'angle nord-est de l'enceinte sacrée, un autre monument de sa dévotion, de sa richesse et de son goût artistique, la célèbre Lesché, dessinée par Polygnote, de Thasos, où nous n'en avons retrouvé malheureusement que quelques pierres avec des positions tracées d'un enduit bien soulevé qui peut n'être pas très ancien. Mais nous connaissons assez bien un autre trésor pour qu'il ait pu nous servir de modèle en quelques parties de notre restauration: c'est celui qu'avait élevé dans l'enceinte d'Athéna Pronaia, au lieu dit Marmaria, la grande métropole des colonies de la Méditerranée occidentale, le fondateur de Marseille, l'ionienne *Phocée*. Je vous en ai montré les ruines et vous avez peut-être gardé la mémoire de ce tore cannelé surmonté d'un chapelet de perles qui forme au socle une ceinture élégante, et qui ingénieusement se transforme sur la façade en un degré dont la partie inférieure seule soutient les cannelures. Les oves et les rais de cœur en composent l'ornement principal; et le chéneau est, comme celui du Trésor de Cnide, décoré de palmettes et de lotus, d'un dessin plus simple, seulement d'un contour plus sec et d'un arrangement plus sévère; des gargouilles en couples de bois, des acrotères qui avaient la forme de victoires, un fronton rempli de figures, une frise continuée de bas-reliefs représentant des scènes de combats lui composaient une parure aussi riche que celle du Trésor de Cnide, bien que sans doute d'une manière un peu plus rude et archaïque. Les restes sont, hélas! plus faits pour exciter nos regrets que pour satisfaire notre curiosité; ils ne laissent du moins aucun doute ni sur l'origine ni sur la date du monument, ni sur sa splendeur luxueuse. Intéressant par ses ressemblances avec le Trésor de Cnide, il ne l'est pas moins par ses différences: la principale est la substitution de sa colonne à la Caryatide, et cette colonne est elle-même d'un type très particulier. Elevée sur une base, semblable à celle de la colonne d'Ephèse, très large et très haute pour le monument, en déséquilibre, si j'ose le dire, avec les proportions canoniques, comme nous l'avons remarqué à propos d'autres éléments du décor, elle est couronnée non pas d'un chapiteau à volutes, mais d'un chapiteau à larges feuilles épanouies en corbeille, qui rappelle à la fois le chapiteau à feuilles de palmier des Egyptiens et le chapiteau en corbeille des édifices persépolitains.

Ce chapiteau a été vu et dessiné autrefois par Cockerell; nous l'avons retrouvé en bien plus mauvais état que lui: mais il nous a été facile de le restaurer, grâce aux cinq fragments du même genre que nous avons retrouvés à la gymnase et dans diverses parties du sanctuaire, en particulier au voisinage de la petite porte du mur oriental, auprès de l'angle S.E. du mur polygonal autour et au-dessous des ruines du Trésor de Cyrène et presque dans l'angle S.E. de l'enceinte elle-même au voisinage de l'entrée du sanctuaire. Ils étaient associés à des bases de colonnes ioniques de dimensions égales à celles du Trésor de Phocée, à des débris de chéneaux, de larmiers décorés de rinceaux, de palmettes et de lotus, comme ceux des Trésors de Phocée et de Cnide, et nous en avons pu conclure l'existence en ces parages d'un troisième trésor érigé par une ville ionienne; ce devait être celui de Clazomènes, à en juger par le témoignage d'Hérodote. Il s'élevait sans doute sur des fondations en tuf dont la largeur



FIG. II.—FRISE DU NORD: LA GIGANTOMACHIE.

et la solidité supposent l'existence d'un monument disparu, et qui pourraient avoir été coupées quand on avait une porte dans le mur oriental, et une voie pour y conduire. Enfin ce trésor qu'Hérodote nomme seul semble avoir été détruit aussitôt. J'appelle votre attention sur ce type de chapiteau; je vous en indiquais tout à l'heure ses origines égyptiennes; je vous en signalais l'application fréquente dans les monuments de la Perse au sixième siècle, où ils pourraient bien avoir été introduits par des artistes ioniens. Nous savons qu'il n'en manquait pas à cette cour, et nous connaissons précisément le nom d'un d'entre eux, Telephanes de Phocée; beaucoup d'entre vous se rappellent certainement avoir vu un chapiteau du même type à Athènes où les Attalides l'avaient importé dans les portiques dont ils décoraient cette ville après l'avoir souvent employé dans les édifices de Pergame elle-même. Ici encore nous pouvons constater l'originalité et la perpétuité du type dans le terroir où il est né.

Voilà donc au moins trois monuments contemporains, semblables dans leurs traits généraux, profondément sains dans leurs détails, pour attester la vitalité, la richesse, ou, pour bien dire, aussi la beauté et la souplesse de l'art ionien; voici encore un signe plus manifeste de son rayonnement et de sa force d'expansion, c'est une imitation, on pourrait

presque dire une copie, du Trésor de Cnide décoré près de lui côte à côte, sur le bord opposé de la voie, par les habitants de Siphnos. Enrichis par leurs mines d'or, pressés par le Dieu de lui consacrer la dime de leur gain, désireux de briller comme tous les parvenus, ils veulent avoir aussi leur trésor et pareil au plus beau. Quel modèle prennent-ils ? Celui de Cnide, et ils lui empruntent avant tout la plus grande nouveauté, son plus magnifique ornement, les Caryatides. Rien de plus curieux que cette imitation, rien de plus instructif que la comparaison des deux œuvres jumelles. Ce sont deux sœurs que ces Caryatides, mais combien elles diffèrent par la physionomie, ici plus bête, là plus intelligente et plus fine ; par les formes, ici plus rondes, plus pleines, là plus sévères et plus raides ; même différence dans les ornements ; et ainsi le voisinage de ces deux trésors nous révèle, avec la prédominance des types ioniens, l'indépendance des Grecs occidentaux qui déjà presque à son insu se dégage et qui se glisse presque dans l'imitation.

C'est encore à l'orient qu'est empruntée la corruption artistique de la colonne de Naxos : le fût aux cannelures multiples, le chapiteau aux amples volutes, au gorgerin saillant d'oves plates et larges, vient en droite ligne de l'Ionie ; et c'est l'Asie qui par l'Ionie encore a fourni le modèle de ces animaux ailés placés au sommet d'une colonne.

On voit quelle place tenaient à Delphes à la fin du sixième siècle les créations du génie ionien ; j'en multiplierais indéfiniment les exemples si au lieu de me borner aux œuvres de l'architecture j'énumérerais les offrandes de moindre importance en marbre, en terre cuite, en bronze surtout, qui affluerait de l'orient à Delphes aux septième et sixième siècles et dont nous avons exhumé les restes en abondance bien pauvres auprès de la réalité. Pour ce qui est des constructions, elles égalent en nombre, dépassent en splendeur les autres édifices élevés dans le même temps ; l'ordre ionique prévaut pour ce temps sur le dessin. Il impose ses formes, il impose son luxe jusque dans les temples, si l'hypothèse est fondée que l'emploi du marbre dans le grand temple d'Apollon lui-même ne soit qu'une imitation de la somptuosité des Cnidiens et des Siphniens.

Ces constructions, ces objets de tout genre sont les témoins de la provenance de création et d'expression de la Grèce asiatique. Il y a véritablement à Delphes une période que l'on pourrait appeler ionienne, et les faits artistiques que nous avons cités ne sont que des exemples et des cas particuliers d'une isolation historique beaucoup plus large ; l'influence artistique va de pair avec l'influence morale et politique. Les Ioniens et les Asiatiques hellénisés, cités, rois et tyrans sont les plus empressés adorateurs du dieu, les plus fidèles croyants de l'oracle, les plus généreux donateurs. S'agit-il d'orner le sanctuaire de magnifiques offrandes, de rebâtir le temple incendié, un Alyatte, un Crésus, un Amasis rivalisent de zèle, et se fient à des artistes ioniens qui sont leurs camarades. Veut-on inscrire sur les parois du temple d'Apollon des maximes capables d'inspirer aux hommes la vertu, la sagesse pratique, c'est la pensée ionienne qui les produit, car on les emprunte aux sept sages, en majorité Grecs d'Asie et des îles.

Aussi bien, Mesdames et Messieurs, la civilisation hellénique tout entière a-t-elle eu sa période ionienne. Excité par le commerce, soutenu par les dons affluents et la richesse, inspiré par les modèles des civilisations antiques avec lesquelles il est en contact, le génie ionien, invente, unit, crée, emprunte, et de ce contre-coup d'actions et de réactions sortent en foule les émotions de tout genre : procédés industriels, art plastique, littérature, poésie épique, lyrique, philosophie et morale, il résulte que tout naît sur les rivages favorisés des dieux. Et comme les colons, les commerçants, les artistes et les poètes de l'Ionie portent au loin toutes ces inventions, tout le monde grec subit l'influence de l'esprit ionien. L'art surtout prend une espèce d'unité ; les fils d'Archermodos, les exiles de Samos et de Milet emportent avec eux leurs procédés techniques et leur style, et l'unité de l'art grec se con-

stitue pour la première fois de l'Asie à l'Etrurie, peut-être jusqu'à l'Espagne même, sous la forme ionienne.

Voilà de quel mouvement intellectuel, de quelle éclosion artistique le Trésor de Cnide est pour nous le témoin; il fait époque dans l'histoire de l'architecture et de la sculpture grecque, il marque aussi une date dans l'histoire de la civilisation hellénique, qui est celle même de l'humanité. J'aurais voulu vous parler plus dignement d'un sujet si capable de vous intéresser; excusez-moi si la crainte des longueurs et la défaillance du talent ne m'ont pas permis de répondre à votre attente et à votre bienveillance.

DISCUSSION OF M. HOMOLLE'S PAPER.

MR. JOHN SLATER, *Vice-President*, in the Chair.

DR. A. S. MURRAY [*H.A.*], who was asked by the Chairman to propose a vote of thanks, said: After the cordial reception you have given M. Homolle, I need not assure him how sensible we are of the great compliment he has paid us in coming all the way from Athens to give us this splendid address on one of the most charming Greek buildings that I or that anybody has ever seen—the Treasury of Cnidos—followed by his interesting discussion of its relationship to the art of Ionia. But at this hour I must not attempt to particularise or to express any opinion except that of the greatest admiration for everything M. Homolle has said. I would much rather call your attention to the fact that we are under obligations to him much greater than those of his appearance here to-night. From the beginning to the end he has been the head and spirit of those excavations of the French at Delphi, which in our time have no equal. He has now before him the task of completing the publication of the splendid work recently begun to be published, and we may assure him of our most cordial wishes that he may be able to finish that gigantic task of his with all the success with which he has begun it. Therefore, I propose a very warm vote of thanks to M. Homolle.

MR. G. A. MACMILLAN: I have much pleasure in seconding the vote of thanks proposed by Dr. Murray. I feel that the honour of being asked to second this vote has been assigned to me merely as the representative of the Hellenic Society in the humble capacity of Secretary. I most cordially agree with all that Dr. Murray has said as to the pleasure it has given this distinguished gathering to listen to M. Homolle's lucid exposition and eloquent description not only of the general plan of the site of Delphi, but in particular of this exquisite monument which he has revealed to us step by step. Perhaps I may be allowed also in seconding this vote of thanks to congratulate the Royal Institute of British Architects on their brilliant success in inducing

M. Homolle to come over to this country, and for the first time to give an account here of his great work. I am only sorry that the idea did not occur first to the Hellenic Society; but I might be permitted in this company to say to M. Homolle, I am sure, in the name of the other members of the Council of the Hellenic Society, that we hope very much that next year, when our Society celebrates its twenty-fifth anniversary, we may be able to persuade M. Homolle to make another visit to this country, and perhaps to take up another point in his great work before the Hellenic Society.

DR. ARTHUR J. EVANS, F.R.S.: I may perhaps say a few words in association with what has been already said by Dr. Murray and Mr. Macmillan. I think perhaps that only those who have been over the site of Delphi in its old state, who remember a rustic village covering all that wonderful mass of remains that has been brought to light by M. Homolle and his associates, can thoroughly realise the magnitude of the work which has been carried out there. It was a great thing to undertake. I speak rather as a "Minóan"—an outer barbarian—and as one who has hardly a right to speak on the subject of classical Greece; but one feels that in Delphi we have the very beginnings of Greek religion, and that we see here points of union with the still older religion of which we have been finding traces in Crete. We have the old Omphalos, which fits on to the same cult as that of the Cretan Zeus. We have even, as I gather from M. Perdrizet, one of M. Homolle's assistants, the fact that one of the most remarkable early subjects found, the marble mouth and part of the face of a lion—the spout, perhaps, of a fountain—is the actual reproduction of one of the most remarkable objects found at Knossos, and must go back to remote antiquity. There, on the site of one of the earliest cults of Greece, where the most brilliant of the Greek gods was worshipped, monuments were raised which brought the whole civilised world together. Not only were

there here monuments recording the Defeat of the Persians, but those of the great Western power of Gelôn and his associates, who triumphed over the Carthaginians—monuments that recorded the "eternal struggle" of the West against the East, which modern Greece seems inclined at this moment to belie. It was on this spot that the French Government, under the inspiration of M. Homolle, undertook the great work of excavation. When one remembers that they have had not only to move a whole village and to spend vast sums of money, but to conduct most difficult negotiations with a very jealous Government (which, however, of course appreciated the results to be obtained), one can only the more admire the work that M. Homolle and his associates have carried through. And I think one must also admire the great public spirit of the French Government in undertaking it. We have heard a good deal of the *rapprochement* of France. I hope one side of that *rapprochement* will be that we shall take a leaf from the French book, and that the English Government will imitate these brilliant undertakings of our neighbours. It is not only the greatness of the work, it is not only the actual excavation of these monuments—though it is that indeed which shows the public spirit of the French people and the patience and devotion of those who like M. Homolle have carried out this work—but it is more than that: it is the painstaking and scientific reconstitution of the *disiecta membra*—the fragments that have been brought out, and the piecing together of important monuments—it is that process which has been so brilliantly illustrated by M. Homolle this evening, which shows us that even beyond the greatness of the undertaking we before all must pay homage to the genius of the explorer.

MR. J. L. MYRES: We all of us feel an immense interest in the investigation of which M. Homolle has given us so full and so detailed an account. In this place it is no paradox to say *De minimis curat architectus*. Putting aside the great importance of the pediment and the frieze and the Caryatides, one of the things which must have struck us all is the extraordinary genius displayed in the adaptation of small means to small ends in the little details of those ornaments in which the Ionian artist clearly felt so very keen and living an interest. When we saw that little palmette among the lotus in the corner sprouting as it were, and not merely altering the contour of its leaflets, but sprouting out as though

even the bigger leaf were not going to be quite enough, and we saw the little leaflet in the middle; and when in the adjacent fragment we saw the lotus which could not quite reach to the corner and sprouted a little lotus bud in the corner itself, I think we felt that here we have one of those cases where what at first sight looked like a conventional art was in a very real sense a living art: that the architect had only to play his tune and the stones fell into their place, as Orpheus played his lute and the rocks followed: that here was one of the indications of a real dominion of man over Nature, of a living art, in the details, as in great things; and when we watched to-night the way in which, out of that apparent heap of rubbish, which I remember so well in the days before M. Homolle waved his magic wand over Delphi, from one chip here and another there, such a result follows, we have felt that here again, in archæology as in art, we have a living school—the École Française.

SIR LAWRENCE ALMA-TADEMA, R.A. [H.F.]: I hardly know what to say. I have been listening and following the various phases of the development of art fetched out of the ruins, and it has made me feel that I should like to go and dig too—it must be so delightful to reconstruct the Temple of Delphi. What a great boon it is for us who have dreamt so long of that centre of civilisation and that people that lived for the beautiful! But I am so full of what I have heard that I have nothing else to say, but to tender my sincerest thanks to the man who has come from so far to gladden us with so many phases of beauty.

The vote of thanks having been put from the Chair and carried by acclamation, the Chairman addressed M. Homolle as follows:—

M. Homolle, c'est avec le plus vif plaisir que j'ai l'honneur de vous offrir de la part de cet Institut nos profonds remerciements de la conférence que nous avons suivie avec tant d'intérêt. Il y a plusieurs ans nous avons reçu ici dans cette salle Schliemann, le célèbre explorateur des ruines d'Iliou, ville à demi légendaire, à demi historique. Et aujourd'hui nous sommes fiers, nous autres membres de l'Institut Royal, d'accorder un accueil bien reconnaissant à vous, monsieur le révélateur, le reconstructeur de ces temples classiques de Cnide qui sont, pour l'archéologue et pour l'architecte, d'un intérêt suprême. Il ne faut pas oublier notre dette de reconnaissance au gouvernement français qui nous a prêté cette collection superbe de dessins incomparables dont on a décoré nos murs.

M. Homolle briefly replied in acknowledgment.



9, CONDUIT STREET, LONDON, W., 21st Nov. 1903.

CHRONICLE.

Monsieur Homolle's Paper.

M. Homolle, accompanied by Madame Homolle, arrived in London from Paris on Monday morning, the 16th inst., and came at once to the Institute to complete the arrangements for his lecture that evening. He brought with him the water-colour drawings by M. de Fossé as shown at the meeting, and the series of photographic slides which added so much to the enjoyment of the audience. The illustrations given with the text on foregoing pages are here published for the first time. They are printed from blocks processed for the great work on Delphi which M. Homolle is preparing for publication, and the Institute is specially indebted to him for his kindness in lending them for the JOURNAL. The lecture was delivered in French, but with so clear and distinct enunciation that anyone with a knowledge of the language had no difficulty in following it. The sympathies of the audience were enlisted at the outset by the feeling tribute paid by the lecturer to the memory of the late Mr. Penrose, and his reference to the happy relations now existing between France and Great Britain. Among distinguished guests present besides those who spoke were Mr. D. G. Hogarth, Mr. Cecil Smith, Mr. Walter Leaf, and others who have assisted in bringing to light some of the great monuments of the past.

Monsieur Tournaire's Drawings.

The magnificent series of drawings exhibited in the Institute rooms last week were kindly lent by the French Government, at the request of Monsieur Homolle, in order to illustrate his paper on the Treasury of Cnidus and the monuments of Ionian art at Delphi. The drawings were the work of Monsieur Joseph Albert Tournaire, the architect attached to the Commission appointed to conduct the excavations and researches.

Monsieur Tournaire was born at Nice, and came to Paris in 1879, when he entered the well-known atelier of M. André, and commenced his architectural studies. In 1882 he carried off the second Grand Prix, and in the following year passed the

examination for the architect's diploma. In 1888, at the age of twenty six, he carried off the Grand Prix de Rome, and for the four following years pursued his studies at Rome and elsewhere. His "Envoi-de-Rome," viz., the work of the last year of his travelling studentship, was devoted to the Temple of Juno Lacinia at Girgenti, in Sicily. The drawings which are required for the "Envoi" are of two kinds, viz. a complete set of plans, elevations, and sections showing the remains actually found (*état actuel*) on the site selected; and a second set showing the conjectural restoration of the building or buildings on the site. Both sets of drawings are shaded and tinted with that marvellous dexterity and accuracy which are based on traditional custom and can be acquired only by long and continuous study—a study which virtually commences with the student's first design, it being the custom to shade and tint every study made either as a sketch or for the *rendu*, or finished set of drawings.

The present writer has dwelt upon these considerations because otherwise it would have been difficult to understand how M. Tournaire could find time to measure all the remains of the buildings as uncovered from time to time, and to record them, in some cases year by year, in drawings of a most exact nature; to produce a second set of drawings in which the conjectural restoration of some forty buildings with all their sculptured accessories is represented, and in the most marvellous manner; and that notwithstanding all this work, and including visits to Delphi for two or three months each year, he has been enabled since 1892 to start and maintain an active practice in Nice, Bordeaux, and Paris.

To have been able to portray and suggest as M. Tournaire has done in a single drawing (to take one example only, viz. the elevation of the sanctuary and its surroundings at Delphi) a series of buildings and monuments in various planes, extending from the foreground in front of the sacred enclosure to the theatre cut out in the rock behind the sanctuary, in which, besides the temple of Apollo and its terraces, are some forty to fifty treasuries, porticoes, colossal statues, monumental columns, &c., all of which take their proper position amidst the trees, shrubs, and other accessories—is a feat of which the artist may well be proud.

We here in London are most grateful to the French Government for lending us so magnificent and valuable a collection, and regret much that owing to the Institute rooms being required at the end of the week for the Examinations it was found impossible to keep open the exhibition of these magnificent drawings after Wednesday. Those who availed themselves of the opportunity to study them must have been astounded, not only at the stupendous nature of the work, but at the great power shown in the composition and drawing of the figure sculpture throughout, and the freedom.

knowledge, and facility evinced in its representation, as well as in that of the numerous treasuries, porticoes, and other buildings.

It is much to be regretted that the younger members of the profession, viz. the Associates and Students, should on Monday evening have made themselves conspicuous by their absence.

R. PHÉNÉ SPIERS.

. The following is a list of M. Tournaire's drawings above referred to:—

1. Excavations at Delphi: state of the works, November 1893.
2. Plan of the Village of Castri, showing the progress of the excavations and the site of the Temenos of Apollo.
- 3-4. Old houses of the Village of Castri in course of demolition: state of the works, November 1893 and November 1894.
5. Ruins of the Temenos of Apollo.
6. Plan of the Temenos of Apollo: present condition of the excavations.
7. Plan of the Temenos of Apollo, as restored according to the existing remains and ancient MSS.
8. Restoration of the Temenos of Apollo.
9. Treasury of the Athenians, Delphi.
10. Ditto, Façade on the Sacred Way.
11. Ditto, Principal Façade.
12. Ditto, Restored Pediment and Frieze.
13. Ditto, Restored Plan.
14. Treasury of the Cnidians, Delphi: Façade on the Sacred Way.
15. Ditto, Restored Plan.
16. Ditto, Principal Façade.
17. Acanthus Column.
18. Column of the Naxians.
19. Stadium: (1) Present state, (2) Plan as restored.
20. Monument de Paul Émile.

The illustrations to M. Homolle's Paper included also rubbings of four blocks of stone on which are carved the musical scores, in the ancient Greek character, of hymns to Apollo, here distinguished by the names "First Hymn" and "Second Hymn." Each hymn occupies the face of two stones. Photographs were exhibited showing the present appearance of the stones, and also a print of the scores in modern notation.

Proposed Registration of Plumbers.

A conference between the Plumbers' Company, the Royal Institute of British Architects, and the representatives of the larger water authorities of the country, was held on the 17th inst. at the Guildhall to discuss the question of the technical education and registration of plumbers, and the efficiency of plumbing work generally in connection with the public supply of water. Dr. Robert Crawford (Warden of the Plumbers' Company)

occupied the chair. The Royal Institute of British Architects was represented by Mr. H. D. Searles-Wood [F.], Mr. Thomas Blashill [F.], and Mr. W. D. Caröe [F.], and the British Association of Waterworks Engineers by its secretary (Mr. Percy Griffith). There were present also delegates from the water authorities of Birmingham, Glasgow, Sheffield, Hull, Bradford, Cardiff, Dublin, &c.

Dr. Crawford remarked that the Plumbers' Company had done a great deal towards stimulating public interest in the matter of good plumbing, more particularly from the health point of view. Undoubtedly the country had been thoroughly aroused to the advantage to be derived from an increase of responsibility and skill on the part of the plumber. On its sanitary side, much that was of value had been done in the training of plumbers, and the attitude of local authorities towards plumbing had greatly changed as compared with what it was a few years ago. Of late, however, another department of the plumber's work had come into prominence—that relating to the prevention of the waste of water in domestic use. In convening the conference to consider this subject in particular, the Plumbers' Company did not suggest that the water authorities did not know how to manage their own affairs, but it was thought possible that the Company might act as a sort of line of union for the discussion of the means to be adopted in order to secure greater uniformity in respect of by-laws, fittings, and the skill and qualifications of plumbers. He concluded by moving a resolution approving the efforts of the Plumbers' Company to secure the more efficient training of plumbers and the registration of qualified men, and pledging the conference to support the Company's endeavours to obtain the necessary legislation in furtherance of that object.

Mr. Hind, in seconding the resolution, pointed out that the effect of the Company's efforts was visible in the improvement which had taken place in plumbers' work during the last twenty-five years. He hoped that architects and others would support the company by employing registered and qualified plumbers in preference to others.

Dr. Crawford mentioned that the Bill promoted by the Company for the registration of plumbers had been viewed favourably by the Local Government Board, but the Government had not seen its way to afford the necessary time to secure its passage through Parliament.

The resolution was carried.

Mr. Searles-Wood [F.] said that as architects they strongly sympathised with the movement for the better education of plumbers. He did not think, however, that they could pledge themselves to the sole employment of registered plumbers, because architects did not interfere between the contractor and his men.—He proposed:—

"That, with the object of giving practical effect to the previous resolution, the repre-

representatives of the Royal Institute of British Architects and the water authorities present recommend that preference be given to the employment of registered plumbers to carry out and inspect plumbers' work executed under architects and water authorities."

In the course of further remarks Mr. Searles-Wood said that the Royal Institute deprecated any interference with the apprenticeship system. It was one thing to execute specimen joints and other things under the direction of a master in a highly fitted-up shop at a technical school, but quite another matter to do it under the conditions in which the work had to be done in a building.

Mr. Holdsworth (Bradford) seconded the resolution.

Mr. E. A. Lees (Birmingham) said that in Birmingham there were a good many firms of the highest repute who had not allied themselves with the registration movement, and the Water Board could not shut their eyes to the fact that those firms carried out their work in a way to which no exception could be taken.

Mr. Atkinson (Hull) said that the same difficulty would arise in his town. If registration was to be adopted, it should be optional for a period, and compulsory only after the lapse of several years.

Mr. Houldsworth observed that registration gave a status to a plumber, and was an inducement to men to register themselves.

Mr. Hind said that they could not at present hope to make registration compulsory, but they could make it desirable and to the advantage of plumbers to register themselves.

The resolution was ultimately carried.

The questions of uniformity of regulations and the standardisation of fittings were afterwards discussed, among the speakers being Mr. Thomas Blashill [F.], Mr. Gale (Glasgow), Mr. Askwith (Newcastle-on-Tyne), Mr. O'Dowd (Dublin), and others, and it was decided to appoint a small committee from the Plumbers' Company, the Royal Institute of British Architects, the water authorities, and the water company engineers, to consider the questions.

The British School at Rome.

The Committee of the British School at Rome, in their report for the session 1902-03, express their great regret that Mr. Rushforth, who has rendered such important services to the School, has been obliged, for reasons of health, to resign the Directorship. It is largely owing to Mr. Rushforth's scholarship, tact, and ready courtesy that the School has won the position it holds in Rome, and especially in the estimation of the other foreign schools. The Committee have appointed in his place Mr. H. Stuart Jones, Fellow and Tutor of Trinity College,

Oxford. The high reputation of the new Director both as scholar and teacher is a guarantee that the prestige of the School will not suffer in his hands. Trinity College has elected Mr. Stuart Jones to a research Fellowship, which will bring a very welcome addition to the somewhat meagre stipend which the Director at present receives. The liberality of a friend of the School has enabled the Committee to appoint, as Assistant Director for two years, Mr. Thomas Ashby, who has been a Student at the School for the last two years, and who, after Mr. Rushforth's departure from Rome in March last, discharged the duties of Director for the remainder of the session to the complete satisfaction of the Committee. The Report continues:—

There have been four students during the past session. Mr. Ashby has continued his researches in the Campagna, and at the International Historical Congress he opened the first meeting of the archaeological section with a paper on an unpublished collection of drawings of monuments along the Via Appia, which will be published by the kindness of Mgr. Duchesne in the *Mélanges* of the French School. Mr. Ashby has also lectured in the American School, at the request of the Director. The School is, moreover, much indebted to him for the care and attention which he has bestowed upon the library. Mr. Cuthbert Blakiston continued his study of the fourth century A.D. He visited Dalmatia, and also examined Roman remains in Austria and Germany. Unfortunately ill-health not only obliged him to return to England early in the spring, but has prevented him from getting the results of his work into form for publication. Mr. McIntyre came out for the first time with a bursary from the University of St. Andrews. His main work was the collation of the eleventh century MS. of Plato in the Vatican, with the object of defining its relationship to the Vienna MS. known as "W." His collation has already been used in the new Oxford text of Plato now in course of publication. The fourth student was Mr. Webb, Gold Medallist and Travelling Student in Architecture of the Royal Academy. Mr. Webb has for more than a year been resident in Italy, making careful studies of Renaissance Buildings. He spent the winter in Rome working up the literature of his subject. He also devoted special attention to the Palazzo Linotte, the Cancelleria, and the Renaissance tombs in the Churches. It is hoped that some of the results of his work will be published in an early volume of Papers issued in connection with the School. Another architectural student, Mr. V. Hodgson, was granted permission to work in the library of the School during a stay of some weeks in Rome.

The second volume of the *Papers of the British School at Rome* is now in preparation. It will contain photographic reproductions of a volume of Roman studies (mainly but not solely architectural) by Andreas Comer, an artist of the beginning of the sixteenth century. The facsimiles will be accompanied by a commentary by Mr. Ashby. On account of the heavy expense involved in the production of more than 160 plates, it is proposed to issue the volume in return for subscriptions for the two years 1902-3 and 1903-4.

In drawing attention to its finances, the Report says that the discontinuance of several subscriptions has been notified, and that the future development of the School is likely to be seriously hampered, unless a considerable addition is made to its resources.

Holborn-Strand Improvement: Building Sites.

The absence of offers for leases of plots of land in the Strand, Kingsway, and Aldwych having been attributed to the fact that disputes as to buildings were to be settled by the architect to the County Council instead of by arbitration, the matter has been referred to the L.C.C. corporate property committee to consider whether the building conditions should be modified. The committee report that there is no provision made for arbitration, and go on to say:—"We have made inquiries as to the practice which obtains in regard to the letting of land on the estates of the large ground owners of London, and we are advised that the conditions in use on these estates are generally more onerous than those imposed by the Council, and that no provision for arbitration is made in the conditions. It does not appear that the Council's conditions have hitherto restricted building operations on its land. From figures which have been submitted to us it appears that the building work on the Council's freehold has increased nearly sevenfold since the year 1897, and we are of opinion that the inability to dispose of more surplus land is not due to the conditions, which have been practically the same for many years past. We are further informed that while the standard of work insisted upon is sufficient for its purpose, the Council does not press this beyond what is believed to be consistent with the circumstances of the case. That the tendency is towards leniency rather than the strict letter of the conditions is in a measure confirmed by the large increase in the building work on the Council's land. Having regard to all the circumstances, we do not think that the Council would be well advised to make any alterations in its building conditions, and we are of opinion that, although there were no bidders for the plots of land in connection with the Holborn to Strand improvement at the last auction, the Council will not experience any difficulty in eventually disposing of the plots under the existing conditions."

Erratum.

With reference to the notice of the late Mr. Martin Brooks in the last number of the JOURNAL, Mr. A. R. Groome [A.] writes that the style of the firm in which Mr. Brooks was partner is "James Brooks, Son, Godsell & Groome," Mr. Groome having joined the firm about a year ago.

The late Mr. T. J. Willson.

Thomas John Willson, who died on 22nd October 1903, at the close of his seventy-ninth year, was the elder of the two sons of Edward James Willson, the distinguished antiquary, and was born in Lincoln. He was educated at Oscott College, and commenced his professional studies in his father's office in Lincoln Castle.

The close intimacy between Mr. E. J. Willson and the two Pugins, Augustus and his son, A. Welby, together with the facilities he enjoyed of study in the Cathedral, naturally turned his studious and critical mind to research in our national mediæval architecture, and he planned a work on the choir stalls of the Minster, making many careful sketches and drawings. He, however, was not encouraged to proceed to publication. He pursued his studies on the Continent. His drawings of the metal screen in the Church of Santa Croce, Florence, and of several beautiful objects from the Treasury of St. Mark's, Venice, were published by Sir M. Digby Wyatt in his *Specimens of Ornamental Metal Work*. In 1846 he accompanied Mr. F. C. Penrose to Athens, to assist him in the researches then made for the monumental work on *The Principles of Athenian Architecture*.

Mr. Penrose, in his preface, speaks of "the beautiful drawings" from which the plates were engraved, as prepared "by my friend and companion, Mr. T. J. Willson," who also "rendered valuable assistance in many other respects." Other illustrations are scattered in various publications; for instance, the plates of the pulpit in the Refectory of Topholme Priory, Lincolnshire, in Collings' *Details of Gothic Architecture*, were by him, although not signed. The general practice in his father's office made him a specialist in agricultural buildings; the plate illustrative of this subject in the Dictionary of the Architectural Publication Society was contributed by him. This special knowledge led him to reside for some time at Burnley, in Lancashire, where he acted as Surveyor to the estate of Mr. Charles Townley. Later on, he also erected farm buildings at Acton-Burnell and elsewhere.

In 1854 circumstances led him to work with me in the enlargement and renovation of the Catholic Chapel at Lincoln (an interior view of this edifice was given in the *Building News* of June 1861), and on his return to London in 1859 we commenced to work together, and continued to do so till 1869.

During this period the public buildings we erected included the Chapel and Lodge, &c., of St. Patrick's Cemetery, Low Leyton, consecrated in 1861: the Churches of St. Charles Borromeo, Ogle Street, London; of the Sacred Heart, Accrington; St. Mary, Turnham Green; St. Catherine, West Drayton, and at Bilbao, in Spain; Schools of St. James, Spanish Place, Wapping, Little Crosby, and at North Hyde, Middlesex; and additions to the Convents at Atherstone and Chelsea. The last work he undertook was, in 1896, the Girls' School attached to the Dominican Priory, Haverstock Hill; in the preparation of the drawings for this work I, at his request, was again joined with him. To this list must be added two memorials erected at Portsmouth in

1862, from our joint designs, that to Sir Charles Napier and of the Cruise of the Chesapeake.

T. J. Willson was an Associate of the R.I.B.A. from 1854 to 1900, when he resigned, but of late he gave up much time to the office of Honorary Secretary to the "Aged Poor Society and the Guild of SS. Gregory and Luke," an ecclesiastical society, and, above all, to a work of filial piety, the collation of his father's "Lincoln collection"; to this he added many of his own careful drawings, hoping that some public body would have acquired and kept intact the entire collection. In this he was disappointed, and several collections have been enriched by what was intended by the original projector to form the basis of a history of the County of Lincoln.

S. J. NICHOLL [A.I.]

ALLIED SOCIETIES.

The Sheffield Society.

In an address on "Architectural Education," delivered by Mr. Hugh Stannus [F.] before the Sheffield Society of Architects on the 12th November, Mr. Stannus said that the ideal curriculum for architectural students, which should fit them not for passing the Institute Examination only, but for their whole Profession, might be divided into Science, Art, and History. They must teach the Science or knowledge of Materials, and of the Construction proper to each. They must teach the Art or practice of Planning, to provide for the requirements of each building; and the further Art (termed Design) to arrange their masses in pleasing Proportion, to emphasise their construction, and to impart Expression to their buildings. They must teach the History of the Evolution of Style, that the student shall know not only what has been done in the past under varying conditions, but also towards what each state of environment tended; and, inasmuch as our clients in these days of easy travel will have seen many of the celebrated Works of Architecture in this and other countries, they must at least have such a general knowledge from Books and Photographs of the typical buildings as will enable them to grasp their clients' references or adduce other examples. The literary ability which will enable the young Architect to write a Report or address a Committee must not be lost sight of.

There are three Institutions in the City which deal with some portions of such a scheme of Education:—The University College, the School of Art, and the Technical Schools; and it appeared to him that the first step would be that the teaching of these should be co-ordinated, to avoid overlapping; and then that those portions for

which provision has not been made should be dealt with by some gentleman of their Society who would be willing to undertake the duties of a Director of architectural education.

Mr. Stannus advocated the establishment of a Professorship of Architecture in Sheffield, in connection with the higher educational institutions of that city. Such a Professor, he said, ought to be responsible for the teaching of Architecture, and should have a proper status among his colleagues, the other Professors, and among his fellow-citizens. He would give lectures not only to those who were going to be architects but also to those who were going to be their clients. By that means the general body of people would realise that Architecture had evolved through the centuries without a break, and that the work of an architect was not merely the arranging of extra quantities with a builder.

If the City Authorities were to realise their duty in this matter, the advantage to the City in the improvement of the buildings and streets of the City would be very great; and thus Architecture would repay to the City, by its increased importance among other cities, for the necessary expenditure. Public Improvements will always lag behind until Architecture takes its proper place in the councils of the citizens. The question before the citizens was, then:—Will they endeavour to help this along? and, if so:—How?

An interesting discussion followed in which some of the leading Architects and Professors of the City took part.

MINUTES. II.

At the Second General Meeting (Ordinary) of the Session 1903-04, held Monday 16th November 1903, at 8 p.m.—Present: Mr. John Slater, *Vice-President*, in the Chair, 34 Fellows (including 14 members of the Council), 32 Associates (including 2 members of the Council), 1 Hon. Fellow, 4 Hon. Associates, 1 Hon. Corresponding Member, and several visitors: the minutes of the Meeting held 2nd November [p. 28] were taken as read and signed as correct.

The Hon. Secretary announced the decease of Silvanus Tremain, of Truro, *Fellow*, elected 1893.

The following Fellows attending for the first time since their election were formally admitted and signed the register—viz.: Alexander Hunter Crawford, President of the Edinburgh Architectural Association; Arthur Henry Ryan-Tenison.

A Paper by Monsieur J. T. Homolle, Director of the French School at Athens [*Hon. Corr. M.*], on *Le Trésor de Crète et les Monuments de l'Art Ioniien à Delphes*, having been read by the author and illustrated by lantern slides and by a series of drawings lent for the occasion by the French Government, the cordial thanks of the Institute were accorded to M. Homolle by acclamation.

On the motion of the Chairman a vote of thanks was passed to the French Government for the loan of the Tournaire Drawings.

The proceedings then closed, and the Meeting separated at 10.30 p.m.

TEST OF AN ARMOURED CONCRETE COLUMN.

By W. DUNN.

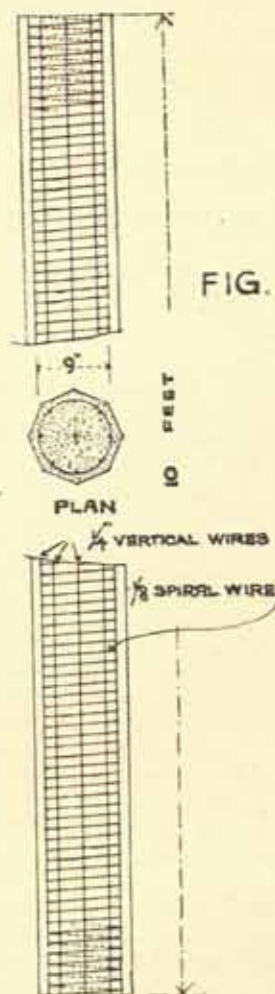
IN *Le Génie Civil* for November and December 1902 M. Considère, Inspecteur-Général des Ponts et Chaussées, in France, published an exceedingly interesting and valuable series of articles on the resistance to compression of armoured concrete columns. In these articles he discusses the theory of resistance and gives the results of numerous experiments on prisms or columns of plain concrete; of concrete armed with longitudinal wires, and bound with wires at intervals in the manner usually adopted by the makers of armoured concrete constructions; and of concrete having longitudinal wires bound with a continuous spiral wire wound round the longitudinal wires. His experiments, made on pieces of octagonal section about $5\frac{1}{2}$ inches to 6 inches across and 1 foot $7\frac{1}{4}$ inches to 4 feet 3 inches long, show clearly the enormous gain in resistance due to the use of the spiral wire; a gain which theory certainly leads us to predict. M. Considère gives full particulars of the materials used and other details; but these need not be quoted here, save to note that his small, carefully-made specimens bore compressive stresses as high as 2.8 to 3.55 tons per square inch, or 408 to 511 tons per square foot, before total failure.

The construction of armoured concrete columns, viewed in the light of M. Considère's researches, seemed to the writer of great practical interest, and when Messrs. Cubitt & Co. kindly offered to make and test a full-size column such as would be used in a building, he gladly accepted the offer.

The drawing, fig. 1, shows the construction of the column. There were eight vertical wires, $\frac{1}{4}$ inch diameter and of the full height of the column—10 feet—bound round by a continuous spiral wire $\frac{1}{2}$ inch diameter full and 227 feet long. This wire was first wound closely round a drum, and was made to spring out exactly to the required pitch of $1\frac{1}{2}$ inch (the wireworker had no difficulty in arranging this). The wires were of mild steel, and the vertical and spiral wires were bound together at the crossings with fine wire to keep them in position while the column was being made.

The framework being ready, it was placed in a deal mould of an octagonal section. Sufficient concrete was then put in to make a layer of about 6 inches thick; this was well rammed down by a wooden rammer of about 8 inches diameter at the end. The mixture of the concrete is given in the test sheet which follows (1 of Portland cement to 2 of Leighton Buzzard sand and $2\frac{1}{2}$ of pea gravel). The column was kept in the mould for five days, and was then removed and kept in wet

sawdust for a further period of fifty-six days. It was then taken to Messrs. Kirkaldy's Testing Works in Southwark, and tested with the results given in the Table. The column was placed in the machine horizontally, but in order to eliminate



as far as practicable the effect of bending stress due to its own weight, a load of one-half that weight and acting upwards was slung from the centre of the column.

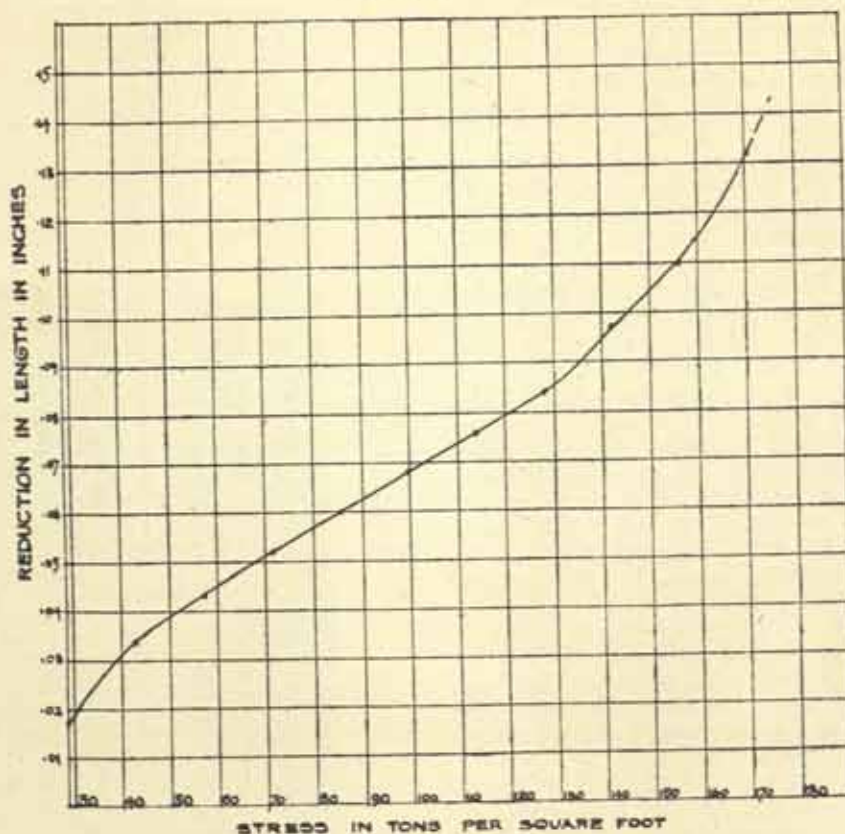
Two 12-inch cubes of concrete of the same age and materials were tested at the same time, as well as a 12-inch cube formed of Portland cement and Portland stone dust, used as sand, also tested at an age of two months.

The figures which show the gradual shortening of the column under the increase of load are very significant, and the writer has endeavoured to make these more readily understood by plotting on the diagram, fig. 2, page 49, the shortenings or strains in terms of the stress per square foot of the section within the spiral wire. This area is chosen as the part outside the spiral wire is not "armoured" concrete, nor does it add materially to the strength of the column to resist compression,

broke in two places, showing the characteristic reduction of area at the point of fracture of mild steel, and the longitudinal wires bulged outwards at the point of failure. The concrete, when examined at that point, proved exceedingly friable and easily rubbed out by the fingers. It seemed that the sand was not as sharp as required in good concrete work. The ultimate breaking stress was 180.9 tons per square foot.

Two samples of the cubes described above were

FIG. 2.



though required as a protection against fire and rust. (See fig. 2).

From this diagram it will be seen that at first there is a great shortening under light load, due to the particles taking a permanent set amongst each other and to the concrete taking up a bearing against the wire. At about fifty tons per square foot the shortening became regular, i.e. the stress and strain were proportional. This continued up to about 130 tons per square foot, when the outer casing of concrete outside the binding spiral wire began to crack; the shortening then increased more rapidly than the load. When failure occurred it was local, and near one end, where the outer casing flaked off (see fig. 3); the spiral wire

tested in the form of 12-inch cubes, and bore 84 tons and 131 tons respectively. Suppose that, instead of being in the form of cubes, these samples of unarmoured concrete had been in the form of pillars of the same proportion of length to diameter as the armoured concrete column tested, they would undoubtedly have failed under a much less load.

Bauchinger made a very interesting series of experiments on Swiss sandstone columns of varying proportions up to about five diameters. From these it appears that if a cube (say 12 inches by 12 inches) of a certain material fails with a load of unity, a prism of the same base and of the same material, but five times the base in height

(say 12 inches by 12 inches by 60 inches), would fail under about .82 of that load. Accordingly, we should expect to find a 12-inch by 12-inch by 60-inch prism of this concrete, unarmoured, to fail under 84 by .8, or 67.2 tons, and 181 by .8, or 104.8 tons. No experiments with which the writer is acquainted enable him to predict with any accuracy the load at which an unarmoured concrete column of the same proportions as that in the test we have been discussing (*i.e.* ten diameters) would fail. The element of bending introduced by the impossibility of getting the load truly axial, by the varying elasticity of the material itself on each side of the centre line, and other causes, cannot be accurately allowed for, and acts with especial effect on a material, such as concrete or stone, not adapted to resist those tensile stresses which the longitudinal and spiral wires are introduced to overcome.

This armoured column began to yield under a load of about 180 tons per square foot where the diagram shows a change in the ratio of stress and strain. It was a gradual, and not a sudden failure, and even after the failure the two parts of the column were held together by the eight longitudinal wires sufficiently to permit of the column being slung out of the machine as one piece by means of a rope slung round the centre of it.

This column was made, by the writer's desire, by men having no special experience in armoured concrete work and under no specially skilled supervision; in fact, under such conditions as would apply in work not done by a concrete specialist. What would have been a safe load to put on it? The writer suggests one-third the load at which failure began, *i.e.* $\frac{1}{3}$ tons per square foot, or a total safe load of 19.0 tons—about the same load as we should use for a 6-inch by 5-inch rolled steel joist weighing 24½ lbs. per square foot, and used as a stanchion 10 feet long. This load might be used at the end of two months in full confidence that the strength and the margin of safety would increase with age.

The cement used was manufactured by Messrs. Martin, Earle, & Co., of 139, Queen Victoria Street, E.C., to the following specification:—

W. CURTIS & Co.'s SPECIFICATION FOR PORTLAND CEMENT
FOR THE YEAR 1903.

By "Portland cement" is understood an hydraulic cement, setting under water, produced by heating to incipient vitrification an intimate mixture of chalk and clay, accurately proportioned, and then finely grinding. To retard the setting, gypsum may be added to the extent of 2 per cent., but no more. With this exception, foreign bodies are not to be added during any part of the process of manufacture.

Fineness of Grinding.—All the cement to pass through a standard 50 by 50 sieve, and not more than 5 per cent. by weight of residue to be left on a standard 76 by 76 sieve.

Specific Gravity.—The specific gravity of the cement to be not less than 3.05 after aeration.

Time of Setting.—Pats made with the minimum quantity of water to set in not less than five hours when the

temperature is 34° F., and in not less than twenty minutes when the temperature is 75° F., and proportionately in time between the temperatures 34° F. and 75° F. The cement is to be considered as set when a needle having a point $\frac{1}{16}$ of an inch square and weighing 2½ lbs. makes no impression.

Soundness.—A Faija's apparatus for testing soundness is to be used. The water in the bath being kept during the experiment at a temperature of 110°–115° F. Two cement pats gauged neat, and then put on a piece of glass,



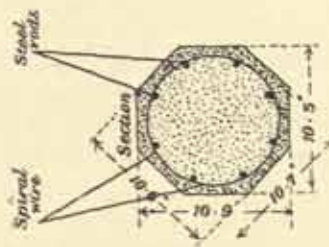
FIG. 3.—VIEW OF COLUMN AFTER FAILURE.

and then tapped out into a circular shape 3 inches diameter by $\frac{1}{4}$ inch thick at centre, and having thin edges, are to be placed first in the warm moist air of the apparatus, and when hard they are to be placed in the water at the bottom of the vessel for twenty-four hours; after that time the pats must be perfectly free from cracks and their shape unaltered.

Strength.—Briquettes made with one part of Portland cement and three parts by weight of standard Leighton Buzzard sand, with the minimum quantity of water, at a temperature of not less than 56° F. and not more than 60° F., thoroughly mixed by hand for not less than one minute and for not more than five minutes, placed in moulds, but not unduly rammed, kept for twenty-four hours in a moist atmosphere, and afterwards kept in water for six days at a temperature of not less than 40° F., shall

TABLE I.

RESULTS OF EXPERIMENT TO ASCERTAIN THE RESISTANCE TO DEPRESSION UNDER A GRADUALLY INCREASED THRUSTING STRESS OF ONE COMPOSITE COLUMN (STEEL AND CONCRETE), RECEIVED FROM MESSRS. WM. CUBITT & CO.

Test No.	Description.	Length. ft., in.	Base area. sq. ins.	Stress, in pounds. Depression, inch, at:												Ultimate stress. lbs. tons.	Remarks.
				28,000	42,000	56,000	70,000	84,000	98,000	112,000	126,000	140,000	154,000	168,000			
L. L.	<div>Age, two months. Composite column (steel and concrete) : 8 longitudinal steel rods, 1" dia., held in position by spiral wire, 1" dia. 11" pitch, wired to longitudinal rods. Proportions.—Concrete : 4:5 cubic feet sand, 2.5 cubic feet gravel, passed through 1" mesh; 2.2 cubic feet (175 lbs.) Portland cement.</div> 	10 0	98	917	934	943	952	960	968	976	984	997	1110	1322	178,400 = 796 Crushed near one end. Spiral wire broken in two places.		
1688				Initial stress, 15,000 lbs. The depressions were taken at intervals of 14,000 lbs. at the request of Mr. Dunn.													

RESULTS OF EXPERIMENTS TO ASCERTAIN THE RESISTANCE TO THRUSTING STRESS OF THREE TWELVE-INCH CUBES OF CONCRETE.

Test No.	Description.	Dimensions, inches.	Base area, sq. ins.	Cracked slightly.			Crushed.		
				Stress, lbs.	Per sq. inch.	Per sq. foot.	Stress, lbs.	Per sq. inch.	Per sq. foot.
L. L. 1689	<p>Age, two months. Marked 1</p> <p>Proportions.—4.5 cubic feet sand, 2.5 cubic feet gravel, passed through 1" mesh; 2.2 cubic feet Portland cement. (Weight of cement, 175 lbs.)</p>	12.0 12.0 x 12.0	144.0	17,000	1,208	777	186,000	1,310	842
1690	<p>Proportion.—1 cubic foot of (slightly Portland stone), passed through 2" mesh; 1 cubic foot Portland stone dust, 224 lbs. Portland cement.</p>	12.0 12.0 x 12.0	144.0	208,100	2,040	131.8	236,100	2,049	131.8
1691		12.0 12.0 x 12.0	144.0	223,500	1,552	99.8	284,000	1,978	127.2

(Signed) DAVID KIRKALDY & SONS.

stand a tensile strain of not less than 150 lbs. per square inch, and similar briquettes kept for twenty-seven days under water shall not break under 230 lbs. per square inch.

The contractor shall bulk the cement and spread it uniformly to a depth not exceeding 3 feet in a dry, well-ventilated shed on his premises. It must be entirely turned over at the expiration of seven days, and again turned over a second time seven days thereafter, and kept

or another week, if necessary, or three weeks in all. The cement is not to be filled into sacks until it has been thoroughly cooled and aerated.

The wire used was also tested by Messrs. Kirkaldy & Son, and the results are given in Table II.

TABLE II.

RESULTS OF EXPERIMENTS TO ASCERTAIN THE TENSILE STRENGTH AND TORSION OF THREE PIECES OF STEEL WIRE, RECEIVED FROM MESSRS. WM. CUBITT & CO.

Test No.	Description.	Original.		Ultimate stress.		Extension in 10 inches.		Test No.	Twists in lengths of 5 inches.						
		Diameter.	Area.	Total.	Per sq. in.	Inch.	Per cent.								
		Inch.	Sq. in.	Lbs.	Lbs.	Tons.			L L						Mean of five tests.
4367	Wire 10 L.W.G.	.127		1,018			.26		4368	33½	33½	33	32½	32	32.9
				1,023			.35								
4369	Ditto.	.127	.127	1,020	1,026	80,787 = 36.1	.20		4370	35	35	35½	33	33	33.9
				1,035			.35	2.7							33.0
4371	Ditto.	.127		1,031			.28		4371	38	36	36	31½	19½	32.2
				1,028			.31								

(Signed) DAVID KIRKALDY & SON.



COLOURED GLASS.

ROYAL ACADEMY LECTURES 1903.—VI.

By Professor AITCHISON, R.A.

PAST PRESIDENT, ROYAL GOLD MEDALLIST.

WE can scarcely call glass the most perfect transparent material; this probably must be reserved for the diamond, though in point of translucent colour glass is probably almost equal to a gem. I do not know that glass has ever been used structurally, though it might be. Nero built a temple of diaphanous marble, and the shutters to San Miniato outside Florence are, I believe, of Pavonazzetto, and give a most marvellous reddish light; and thin pieces of onyx have been used by Sir Lawrence Alma-Tadema instead of glass with great effect. It is, however, absurd to compare diaphanous marble with glass unless you have the marble cut into very thin slices and stuck on the glass, which gives an original pattern in charming colour, as may be seen in Sir Lawrence's house. In glass you can get the apotheosis of colour that outrivals the rainbow and vies with the flame, that plunges you into ecstasies and suggests ineffable bliss, effects so lovely and marvellous that for a time they banish the thought that they can be the result of man's endeavours.

The mediæval glaziers evidently felt the rapture of colour, and knew the fascination it had for the multitude, and they made their churches and cathedrals mere picture galleries to display this heavenly light. Unfortunately for us, we mostly see these galleries without their pictures, through former outbursts of iconoclastic fury.

Although stained glass is not architecture, I do not think it out of place to speak of it, as I not only hope you will hereafter have to build for it, but it has the making or marring of a building in its power; in fact, I may say more, if the stained glass is of the finest quality it will, like charity, cover a multitude of sins.

I propose to give you a short account of what is known of the origin and history of glass, a substance that has added so much to our comfort and to our health, and to offer you my

opinion on the merits of the different sorts of stained glass, to drop some hints on its employment in buildings, and to say something about its future prospects.

How glass was discovered is hidden in pre-historic darkness, for the chemists tell us that we may dismiss as fabulous Pliny's well-worn story of how it was first made in the open air; but as tradition has so hallowed the story that no treatise on glass is without it, I will repeat it. Some merchants had moored their vessels on the seashore by the mouth of the river Belus, and supported their cooking pots with some of the blocks of cubic nitre with which their vessels were laden; the fires melted the sand and the soda, and the fusion resulted in glass.

A more probable account is given by Josephus, who tells us that the art of making glass was discovered by some Jews who set fire to a wood on a mountain, that the heat melted the sand and potash and made it run down the vertical face of the mountain. We have all heard of lumps of dark glass being found amongst the ashes of burnt haystacks, and in large fires I have seen the face of brickwork fused, so that dark green tears had run down it.

After the burning of the Armoury at the Tower of London the gun flints were found partially fused into masses which, on cooling, agglomerated, and these were covered with a green glaze. As it would have been too expensive to burn down a forest every time glass was wanted, we may rather suppose that the constituents and qualities of glass became known in the pre-historic furnaces where metals were smelted and new fluxes tried.

Glass was not only known to the ancient Egyptians, but the Egyptians became very skilful workers in it, and have left most beautiful objects in parti-coloured glass, besides the representations of glass bottles with wine in them 2,000 years before our era. The Greeks knew glass; they could scarcely fail to do so when they had so much intercourse with Egypt, although I do not think it is mentioned in Homer.

Herodotus, who died about 408 B.C., speaks of the columns he saw in the Temple of Hercules at Tyre, each of which was cut out of a single emerald, and at night threw out a marvellous light. These columns were probably of hollow green glass, into which the priests had put lamps. We know that the Santo Catino, or holy grail, now at Genoa, was an engraved dish of green glass, though it was for many centuries believed to be an emerald.

Glass cups are spoken of in "The Acharnians" of Aristophanes, "We drink against our wills from cups of glass and golden chalices"; and "the burning glass" is mentioned in "The Clouds." Aristophanes is supposed to have been born 444 B.C., and to have died B.C. 380. Glass was also known to the Assyrians, and probably to the Chinese, for Pliny's description of the glass of India made out of broken crystal corresponds to a Chinese method of making glass, which was imported into India for enamels.

In our version of the Old Testament glass is not mentioned, but Michaelis, writing in 1754, says the word "crystal" in Job, c. 28, 17, is "zechuchith," which all learned Rabbis before Christ translated as glass. The date of Job is said to be 1520 B.C.

It is needless to say that the Romans used glass, for every boy who has learnt Latin is familiar with Horace's lines, "O fons Bandusiae, splendidior vitro" ("O Bandusian fountain, more brilliant than glass"). Horace is said to have been born B.C. 65, and to have died in the year 8 B.C., aged 57. Vitruvius speaks of glass called *υαλος* by the Greeks. Shortly after our era glass mosaic was used to decorate vaults, ceilings, and other portions of buildings at Rome and in the Roman Empire, but the exact date is, I think, unknown.

Pliny tells us that Sulla's son-in-law, M. Scaurus (58 B.C.), "during his Aedileship, and only for the temporary purposes of a few days, executed the greatest work that has ever been made by the hands of man, even when intended to be of everlasting duration—his theatre, I mean. This building consisted of three stories, supported upon 360 columns . . . The ground

story was of marble, the *second of glass*—a species of luxury which ever since that time has been quite unheard of—and the highest of gilded wood." (Lib. 36, cap. 24.)

It is curious that Pliny gives us no hint of how this glass was used, whether structurally, as windows, or as wall ornaments, but it is believed that slabs of opaque glass were used in this theatre as wall linings; at any rate, opaque glass slabs came into vogue for that purpose later, and were even used as paving in the shape of tiles, and glass mosaic was occasionally used among marble mosaic.

Pliny also says: "There is an artificial obsidian stone (Obsidian) made of coloured glass for services for the table; and there is also a glass that is red all through and opaque, known as 'hæmatinum.' A dead white glass, too, is made, as also other kinds in imitation of murrhine colour, hyacinthine, sapphire, and every other tint; indeed, there is no material of a more pliable nature than this, or better suited for colouring." (Lib. 36, cap. 27.)

That the Romans brought glass to such perfection need hardly surprise us when we hear that Nero paid £50,000 for a pair of cups. There is great doubt about all sums of money mentioned by Roman authors, as a very slight difference in the letters of the MSS. would change the value of the sestertium into sesteritia, i.e. from 2½d. to £8.

As far as I can find out no one has as yet been sufficiently interested in stained-glass windows to dig out the accounts of their first introduction from the writers of antiquity, or of the dark ages. We learn from Pliny that almost any colour could be given to glass, and in his description of gems he says, speaking of the opal, that "there is no stone that is imitated by fraudulent dealers with more exactness than this, in glass." If the Romans set their gems transparently in rings this might have suggested stained glass, or the holding up of a perforated slab with a pattern in which glass had been put to show the effect of mosaic. The late Dr. Middleton was of opinion that the Romans were acquainted with stained-glass windows and used them.

Pliny uses a strong argument to prove that glass mosaic was not known in B.C. 27, when Agrippa built the original Pantheon, and either glass must have taken a rapid stride between that time and Pliny's death in 79 A.D., or else glass mosaic must have been introduced from some country where this mode of decoration was practised, for we find glass mosaic used in fountains at Pompeii.

Mr. Nisbett, quoting from the Chronicles of the Singhalese Kings, about 386 B.C., says: "Windows with ornaments like jewels which were as bright as eyes." This may mean stained-glass windows, but it may not. We know from Pliny that tale and various translucent substances were used for windows, and traces of tale have been found in the rabbets of the windows at S. Prassede at Rome. I give you Martial's* epigram on the subject of windows and conservatories:—

Your oranges and myrtles, with what cost
You guard against the nipping winds and frost!
The absent sun the constant stoves repair;
Windows admit his beams without the air.
My garret too hath windows, but not glasses,
Where Boreas never stays, but often passes.
For shame! to let an old acquaintance freeze!
I had much better live amongst your trees.—(Lib. 8, Epig. 14, Hay.)

But we have ocular proof that uncoloured glass was used in Pliny's time for windows: the pane of glass found in a bronze frame in the House of the Faun at Pompeii; the large square in the bath, 3 feet 8 inches by 2 feet 8 inches; a window described by Sir W. Gell as containing four panes divided by cruciform bars of copper fastened with nuts and screws, to remove the

* Marcus Valerius Martialis, born at Bilbilis, Spain, 43-104 A.D.

glass; and in a Roman two-storied villa on the Herculaneum Road a large glazed bow-window was found—the glass was very thick and greenish, and *set in lead like a modern casement*. You know that Pliny the Elder was stifled at Pompeii when it was destroyed by the eruption of Vesuvius.

Prudentius, 337 A.D., says of St. Paul's, beyond the walls of Rome: "In the windows are displayed glass of varied colours as brilliant as the fields of flowers in spring." And in 398, St. Chrysostom praises the high glass windows of various colours. It is believed that Justinian, who had Santa Sofia built in 532 A.D., ornamented it with coloured windows of cast glass.

I am loth to quote from the "Arabian Nights," because it is supposed to have taken its present form in the fifteenth or sixteenth century, though some of its stories are as old as Homer, but in the "City of Brass," a story supposed to be of the time of the Caliph Abd-el-Melik, the son of Marwan, who reigned from A.D. 685 to 705, there is this passage, which may mean coloured glass: "Around which were lattice-windows, decorated and adorned with oblong emeralds, such as none of the kings could procure." *

Mr. Hendrie, the English translator of Theophilus, informs us "that Fortunatus of Poitiers in the sixth century A.D. praises the bishops who ornamented their churches with stained glass windows;" and Eraclius, of the eighth, ninth, or early part of the tenth century, gives directions for making coloured glass; there is also a MS. given by Muratori, and said to be of the eighth century, where directions are given for making it. Theophilus, of the eleventh century, or, as Viollet-le-Duc thinks, of the twelfth century, in his essay "On the Various Arts," gives directions for making and painting coloured glass, and was evidently well versed in the art of enamelling it; unfortunately, his recipes for coloured glass have been lost, although from the Index to his MSS. he must have given them. Yellow and purple glass he speaks of, but only as found accidentally when white glass was being made; but he speaks of blue, white, red, green, and all kinds of colours, and gives the receipt for making gold mosaic. He also tells us that the opaque glass of the pagan mosaics was melted and mixed with white glass, and says that "the French melt some of this mosaic sapphire in their furnaces, adding to it a little clear and white glass, and make costly plates of sapphire very useful in windows." In his recipe for white glass he tells us it was made with washed sand and the ashes of dried beech wood.

In a MS. on the subject the following notice is found: "This book pertaineth to me, John Elyot, which was written out of an old copy of Anno 1572, which copy seemeth to be above 200 years old." In it is given the recipes for making blue, violet, emerald, pale ruby, ruby, carbuncle, sapphire, hyacinth, topaz, garnet, chrysolite, turquoise, and carnelian glass: the blue owes its colour to cobalt, the violet to manganese, the emerald to copper, pale ruby and ruby to copper and iron; gold is used for the carbuncle—(a stained glass manufacturer told me he remembered his father going into the melting shop and putting twenty guineas from his purse into the melting pot to make the finest ruby glass, but that the price for it now was too low to admit of gold being used)—lapis lazuli for sapphire, gold and iron for hyacinth, gold and lead for topaz, gold and hematite for garnet, zinc for chrysolite, gold and lapis lazuli for turquoise, tin, mercury, and golden marcassite for carnelian.

Coloured glass windows may be divided into two grand divisions—the Eastern and the Western; the Eastern formed by the insertion of thin unshaded coloured glass into, or on to, patterns cut in stone, marble, or plaster; and the Western, where the glass is fitted into lead frames and shaded, although I believe the clear glass roundels of the lower windows in Eastern houses are set in lead.

* Lane's Translation of *A Thousand-and-One Nights*, vol. iii. p. 134.

In Oriental work the chamfered bars of plaster form the pattern, and not only act as a dark separation confining the radiation to their own chamfers, but when seen at a proper angle the effect of shading is produced: one bright jewelled spot of the pure glass is seen, and the remainder of the colour is but the reflection on the chamfer. The ground is formed in this wise: the plaster is thinned and pierced with small round holes, which are glazed with glass of one colour, though often modified in tint and tone; from the small size of the holes you would expect the radiation to be more confined, but the light reduces this large blank area to a fine network. You can see some of these windows of pierced plaster in the late Lord Leighton's Arab Hall.

A most superb window in one of the mosques at Constantinople, said to have been done by Persian glaziers, was copied by the late W. Burges, A.R.A. [fig. 1]. Although I have never seen it done, I should think this mode of glazing might even be adapted to figures. Of course, in Mussulman countries figures are inadmissible. I believe no complete coloured glass window in the West is older than the twelfth century, though some of the tenth and eleventh centuries are spoken of.

It seems a contradiction to speak of grisaille windows under coloured glass, but in old glass the grisaille was not white, but of various light tones, such as sea-green, pale blue, fawn, pink, pale brown, and other pale tints, and the glass was more like onyx, agate, alabaster, or thin mother-of-pearl, than clear glass. The Cistercians eschewed colour, but tried to make amends for its absence by the choice of rich patterns in the leadwork. In many cases the early grisailles are almost equal in beauty to the finest coloured glass.



FIG. 1.—WINDOW, SULEIMANYEH, CONSTANTINOPLE.
From a Drawing in Colour by the late W. Burges, A.R.A.

I once had a glimpse towards dark of the grisaille windows in the Cathedral at Poitiers, and the impression of the soft and varied loveliness of their pearly hues impressed me only a degree less than did the windows of Florence or Chartres.

When grisaille is made of pure white glass, even if it be ground or rough and full of bubbles, nothing more vapid can be imagined, and the introduction of one such window among coloured ones utterly spoils their effect in a building. Even where the glass was of the thickest and best quality, and was greatly varied in tint and tone, it was found advisable to insert coloured bands and jewels, so as to lead the eye to the coloured windows and to prevent a sudden break of continuity; but there was a general inclination to mingle coloured subjects with jewelled grisaille, or to alternate it with them. We hear from Theophilus that he had seen, admired, and tried to imitate the coloured-glass windows of Santa Sofia, and we may well believe, from what we know of the mosaics at S. Vitale, S. Apollinare, and the tomb of Galla Placidia, that the stained-glass windows were not less lovely in colour but more heavenly in their effect.

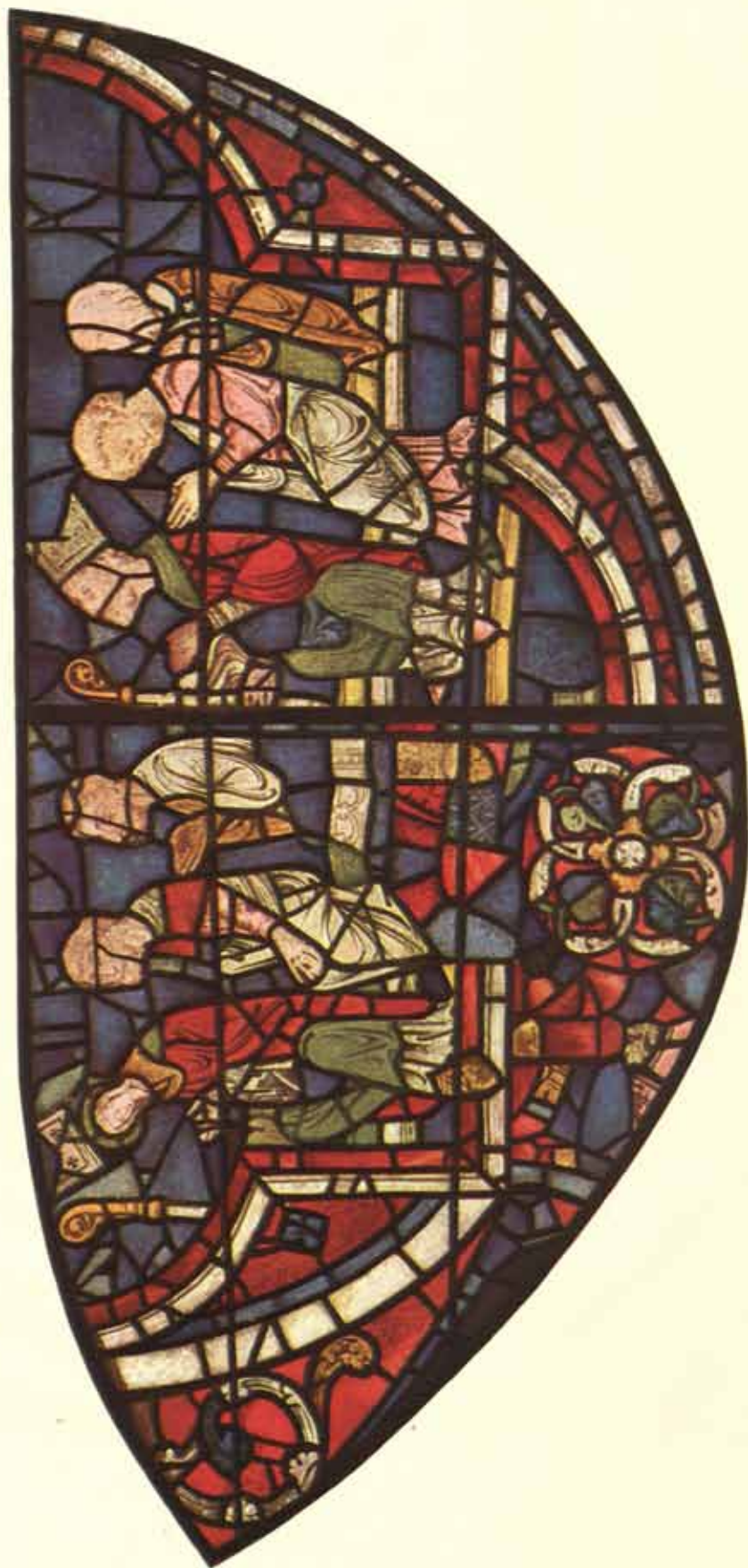
To whatever cause we may attribute it, the fact remains that the glass of the twelfth and early part of the thirteenth century is the most splendid that yet remains to us. The gorgeous colour indulged in by the Romans at Byzantium had, no doubt, its effect, for that was the centre from which all the arts flowed. The Roman emperors found the mosaic for the Mosque at Damascus, as well as for the Kaabah at Cordova; they found the architect for St. Mark's; and we hardly know when Byzantine influence was absolutely at an end before the final extinction of the Roman Empire in 1453 by the Ottoman Turk Mahomet II. The splendour, too, of the Court of the Caliphs must have had its influence on mankind, and doubtless the magnificent stuffs and tapestries made for it found their way into Europe, even if it were only in the shape of presents. Some remains of the vestments of Thomas à Becket, evidently Oriental, are still shown in the cathedral of Sens. The account of the presentation of the ambassador of Constantine IX. to the Caliph-el-Muktedir, A.D. 917,* gives us some notion of the wealth and display then existing at Bagdad; and about this time Arab art and learning began to affect the West, though the forms in these twelfth- and early thirteenth-century windows are still mainly Byzantine. The glazier's art was in the twelfth century at its zenith, and it is possible that at this time the colour sense was exceptionally developed.

We know that Theophilus was a monk, and he apparently wrote his treatise for another monk. If he lived in the twelfth century, his being a monk may account for some of the excellence of the work. But whether the windows were done by monks or laymen, the same qualities would, and will, produce similar effects, *i.e.* when the natural gifts exist with grand opportunities for their exercise, and a passionate desire for the perfection of the art for the art's sake alone, apart from selfish considerations.

The twelfth- and thirteenth-century windows were of the deepest and richest colours, the ground generally being of crimson or azure, and only rarely of emerald; the figures and objects in the pictures were generally paler in tone than the grounds, often strikingly original in their harmonies; and between the pictures there was a fully-coloured diaper; and white was used as a jewel—so precious, indeed, that the narrow strips were often painted to form strings of pearls.

In the aisles of churches patterned windows were generally adopted, and in the clerestories gigantic figures. If you stand in the round part of the Temple Church you will observe the beauty of the east windows, and particularly the marvellous effect of the main forms of the patterns. But it is in the nave of Chartres that we find windows that exceed in magical beauty any other manifestation of colour that man's hand has achieved. We look at

* Lane's *Thousand-and-One Nights*, vol. i. p. 219, note 91.



LINCOLN CATHEDRAL: PORTION OF WINDOW, NORTH TRANSEPT.

From a Drawing by Messrs. Clayton & Bell.

Titian's "Entombment," Bonifazio's "Finding of Moses," or some of the pictures of Giorgione, of Schiavone, Tintoretto, or Paul Veronese; we think it impossible to find greater beauty of colour. But these masterpieces, as far as their colour goes, leave us comparatively emotionless when put in the scale with these windows of Chartres. We say what geniuses these artists were; but when we look at the windows it seems as if some divinity had melted every lovely jewel and every tone of mother-o'-pearl, and poured out a cascade of coloured glory that flames, sparkles, and throbs, that raises us to ecstasies and makes us thankful that the tempter of mankind is not there, to offer us the power of making such for his usual fee; and we ask ourselves if they were really made by men, and not sent down to us direct from heaven to give us a taste of its delights. We have the apotheosis of colour; and though on close inspection we may find the composition ludicrous and the drawing childish, though the saints have purple or green hair, we are no more disturbed by that than a musical devotee is when he hears the most exquisite song sung by a woman with the loveliest and most cultivated voice, because she is singing nonsense in an unknown tongue.

After this apogee of the glazier's art two or three causes combined to drag it down. It is undoubtedly the case that this full and rich toned glass did produce, not merely "a dim religious light," but almost gloom, and this rich coloured glass was probably very dear. The want of funds, of cheerfulness, and of light probably combined to urge the introduction of white glass. So long as this so-called white glass was mainly as low in tone as the coloured, only one object was attained; but it was attained without a sacrifice of harmony. Directly the white glass admitted the light freely, the whole window was out of tone, and you are blinded with the patches of light. The third cause was the insane attempt of the glaziers to vie with the painters, when they could already produce more divine things. They lost the reality to seize the shadow. Accuracy of form, roundness and shadow, perspective and aerial tints, so proper and excellent in a picture, where the light is reflected, were absurd in a transparent material, where the light came through the figures, and where the sun blurred or destroyed every outline. But, for all that, the glaziers came down from their glory in the heavens to strive on earth with the painters, and to be most ignominiously beaten; and until the end of the sixteenth century we gradually pass from poetry to prose. A round or a cusped line in the old glass was a sort of note that a niche was meant; but afterwards the architecture was nicely drawn, and at first gilt, but gradually it became white, with the carving only in pale gold, and filled more than half the window. The figures, too, became better drawn, but their white mantles filled the larger part of the space left; the under-dress, the background of the niches, and the little left of sky or background beyond the architecture were alone deeply coloured. Even the flesh became at last white. There were, of course, clever fellows among the glaziers, and the velvety quality of the white, like the texture of a cumulus cloud, is fascinating; but the art of raising emotion was gone.

In the twelfth, thirteenth, and fourteenth centuries the sun adds additional glory to the windows; in the sixteenth and seventeenth it rather spoils them—though you must understand that this does not apply to the fifteenth-century windows of Florence Cathedral.

By some stroke of luck Florence was to raise again the art to something like its pristine glory, and yet the Tuscans were no colourists. Ghiberti gave some designs for windows in the Cathedral; an Italian gentleman had been studying the glazier's art at Lübeck, and is believed to have been putting windows in Holyrood Palace, when he was sent for to execute these windows. He established himself in Florence and executed these and other windows in the church designed by other artists, those in the chapels being the most lovely; here again white was banished, but gold and emerald were the predominating colours, instead of crimson and azure. When the sunlight streams through these windows you ask yourself if they are

the rivers of health that cure all human ills, and fancy that the angels come to bathe their wings in this emerald and golden glory. Nothing is so beautiful as the windows at Florence—but those at Chartres.

I must not omit a notice of the fourteenth century windows. The most glorious I have seen are those of the Chapter House at York—subjects in patterns filled in between with jewelled grisaille of so low a tone, and so lovely and varied in colour, that it vies in beauty with the coloured glass. Unfortunately one window was destroyed; it was replaced with a modern one copied from the old, but of such a wretched quality of glass that the light admitted differs but little in intensity from what would be admitted by one of ground glass, and makes a painful blot in the building. There are too some finely coloured subjects in the aisle windows of the nave, but set in white, with clear-glass borders much too wide, and patched with rubbish, so that the windows look like a Caliph's coat that has been worn by a beggar; you are so blinded by the sun coming through the slits, holes, and patches that you can scarcely see the beauty of the original stuff. The large west window and the large south window of the first transept of Canterbury Cathedral are glazed with panels of the old windows, some oblong, and some of the form of the vesica piscis, but with pure white borders, and apparently white tabernacle work in the tracery of the window-heads. These have a very good, though perhaps a curious effect: the white is not the translucent velvety white, but jewelled white, and at a distance the effect of the windows is that of white jewelled windows with a slight introduction of colour, an effect by no means to be despised. At Fairford Church the windows are of the end of the fifteenth century, and though of unequal merit contain many beautiful harmonies, and their drawing elicited the admiration of Van Dyck. One window on the south side is very beautiful, nearly all white, but the shading, which is of a rich brown, gives towards evening the effect of brown mother-o'-pearl: all the figures have white mantles, and only small pieces of the coloured dresses are seen—crimson, claret, deep yellow. There are also many beautiful harmonies in the north clerestory of the nave, though generally much lighter in tone; but windows of the north side must necessarily be more transparent, as they get no sun.

There are beautiful and original harmonies in some of the clerestory windows of the choir at Cologne, in the side chapel at Strasbourg, and in the transept at St. Maurice, Angers, at Pisa Cathedral, in S. Petronio at Bologna, Santa Maria Novella at Florence, and elsewhere.

One of the most beautiful windows I have seen of the clear variety is the one of the fifteenth century by Vivarini, in SS. Giovanni e Paolo at Venice: the subject is St. George killing the dragon. St. George is in steel armour on a chestnut horse, transfixing the green dragon in a green field; behind him the blue distance, purple mountains, and blue sky. Commendatore Boni was amiable enough to get this copied for me by Signor Alessandri, as I could not find that it was published [fig. 2]. The window was being repaired when the drawing was made, and shows the blank spaces.

In the choir at the Cathedral of St. Maurice, Angers, there is a window of the giant St. Christopher carrying the Infant Jesus on his shoulders, and wading through a stream. The sky is blue and so is the water, and the Saint has a mantle of deeper blue with a bit of apple-green vest showing above it, and a crimson scarf; his face and limbs are bronzed with the sun, his hair and beard are tawny, and with his staff of golden brown he steadies his steps. The Infant has a fair chubby face with Italian features, a little light gold curling hair and a nimbus, and is dressed in black; the black robe cuts against the blue sky, the blue mantle, the bronzed face, the tawny beard, and also against the crimson scarf, and altogether is one of the most striking and original harmonies I have seen, although it is clear and uniform in tone, and consequently misses all the jewelled glow and sparkle of the finest glass.

Von Linge's enamel windows may be fine when strong sunshine is on them, but in ordinary daylight they are nearly as opaque as a canvas.

If you want to see the effect of churches wholly lit with stained glass go to Fairford, to Strasbourg Cathedral, to St. Etienne du Mont at Paris, and thence to Florence and Chartres, and to some of the mosques and houses in Egypt.

As to the application of glass, it is needless to say we do not want a brilliant light in cathedrals, in churches, in the halls of courts of justice—so pathetically called by the French the halls of wasted footsteps—in the halls and staircases of great public buildings, palaces and private mansions, and the size of the windows in such places may be enlarged to make up for loss of light. In these, stained glass of the most splendid quality may be put, glass of the quality of the finest of the twelfth century or of that of Florence, but, of course, as far as the figure drawing and composition go we want to have the best that can be got, and I may here remark that when this jewelled brilliancy and depth of colour are obtained, all decorative wall painting must be kept simple and unobtrusive, and not try to vie with the gorgeous colours of the glass, but leave spaces comparatively plain for the eye to rest on. I never saw the windows of the Sainte Chapelle in Paris lit by the early morning sun, but in ordinary daylight the effect of the rich painting and gilding lit up by the still richer windows is oppressive, and we long for plain stonework or white windows.

But this quality of coloured glass is not suitable for living-rooms: in these we want but little positive colour. If the outlook is pleasant or necessary, the colouring must be confined to window borders, and the colours must

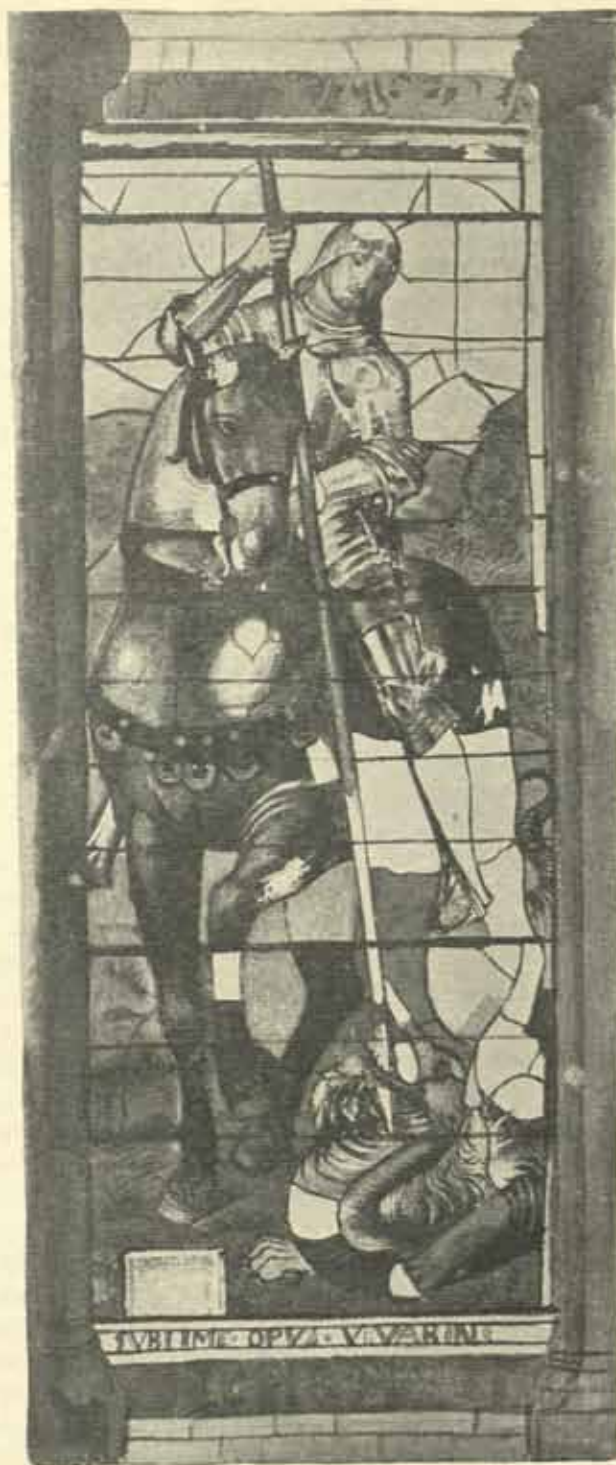


FIG. 2.—WINDOW IN SOUTH TRANSEPT,
CHURCH OF SS. GIOVANNI E PAOLO, VENICE.

be sober, such as will not dazzle, fatigue, or annoy us.

Slight colour may be successfully used where a blank wall or an unpleasant prospect is to be shut out. In picture galleries and other places where pure white light alone is wanted we must banish colour, if we cannot so blend it as to make pure white light; still there is ample opportunity for much to be used, if it be but to give a little interest and warmth where half the year the prospect is most dreary, chilling, and forlorn. Nothing is prettier than to turn a skylight into a pergola with vines and grapes, or to cover it with leaves of the Virginia creeper, or even with some pleasant pattern; a little colour, with much human skill, is mostly a pleasant object.

It is mainly owing to the Gothic revival that stained glass has been awakened from its long sleep, and has spread itself to such an amazing extent. Not only are our churches and cathedrals being filled with it, but it is a rare occurrence to find a new building or house of any pretension without some specimen of stained, painted, or enamelled glass, though the last is mostly bad.

Where the avowed object of the promoters of stained glass was imitation we cannot blame those who executed it for producing imitations; the stereotyped phrase of one at least of the great deceased architects (W. Burges) was, "What would a thirteenth-century architect say of this?" and if it was not the phrase it was the thought of many other architects. Though we are now beginning to deplore these forgeries, whether in stone or stained glass, we must bear with what has been done, at any rate when it is not too abominably bad, and only hope that in the future the glass as well as the stone may bear the stamp of the century in which it was fashioned, that the figures should at least be well drawn, and the writing be that of our own day; the present European costume is so ignoble that I fear it is beyond the power of art to fit it for a picture. To the best of my belief I have never seen a modern imitation of a twelfth or thirteenth century window that could be mistaken for a first-rate old one. The best imitations I know are those of the Sainte Chapelle, and possibly they might be taken for bad windows of the time, though the whole tone is too uniform. I do not say this out of any love for antiquity. I would, on the contrary, much rather think that the modern windows are the best. "The past is nothing, and at last the future can be but the past," but we must not shut our eyes to facts, and we must so use the works of the past as to enable us to excel them.

The glaziers tell us that the glory of old glass depends on its age, the decay of the glass, and its being partly covered with dust and lichens. But hear this from a glass maker:—"Decay undoubtedly tends to harmonise the colours of glass, but there are specimens of ancient glass which show no signs of decay, and which nevertheless possess a softness and depth of colour which have seldom been attained by modern manufacturers . . . The effect of old glass lies deeper than the surface, and depends upon its chemical and physical nature . . . Ancient glass resembles in its physical nature horn rather than glass. It is translucent, but neither appreciably refracts nor disperses the rays of light, merely sifting them, and suffering them to pass."*

Viollet-le-Duc also has some more remarks to the point:—"The inequality of thickness in the glass which renders it so hard to fix in the lead is one of the conditions of the harmony and vivacity of the tones. When the pieces of glass are flat and of equal thickness the light strikes all the pieces in a window at the same angle, and a uniform refraction ensues; but when these bits of glass are full of knobs and unequal in thickness, they present to the light surfaces which are not on the same vertical plane, from which result varied refractions, adding peculiarly to the brilliancy of the tones and contributing to the harmony; thus it is that in matters of art the perfection of the product is often in inverse ratio to its effect."†

* *The Principles of Glass Making*, by Harry J. Powell: Bell's "Technological Handbooks" Series (1883), pp. 95, 96.
 † Viollet-le-Duc, *Dict. Raisonné, Art. "Vitrail."*

It is only necessary to see the best modern imitations of twelfth and thirteenth century glass in the same building with fine old glass to be convinced that the statement that the superiority of the old depends on decay is the result of an hallucination: the inferiority is too marked, the colours are less rich and less deep, and consequently no amount of obliteration will raise them to the level of the old glass.

Still, no one who has examined old glass can deny that it is generally nearly covered with dirt, that its outer surface looks worm-eaten, and some of it is often semi-opaque; chemical changes have added to its beauty, they have changed white into opal, and stress of wind and gravity have bulged the surface into hills or sunk it into valleys, and so added to its variety of tone, and dirt has contributed to its jewelled effect.

The most successful imitation of early fourteenth century glass I have seen, is the large north window in the transept at Durham, which has the throb and sparkle of old glass, but when we come to a later period, to the velvet white, and to the still more beautiful pale brown mother-o'-pearl, the imitations are excellent.

The clergyman of a country parish, even if he be a man of taste, cannot always prevent an abominable stained-glass window being put up by some wealthy parishioner, but surely in London, with a Royal Academy of Arts for an umpire, our public monuments should not be disgraced by the admission of abominations about which they are not even consulted, though there may not be a professed glass painter amongst them.

The south windows of the transept of Westminster Abbey might well have been enlarged from those in the plaster churches with a candle in them that are hawked about, and must make us a laughing-stock to all people of taste. Are they even equalled by the modern stained glass in Cologne Cathedral?

As to the prospects of stained glass, I said before that its extension has become vast, and of the prose sort there are beautiful and original varieties containing new harmonies of restrained colour, or, to say the least, harmonies that are new to me, and, even if they have been extracted from minor harmonies in old glass, we should be none the less thankful: to bring into prominence overlooked beauties is a genius in itself. I may point to some of the windows in the eating-rooms of the South Kensington Museum; graceful designs may be found in the Holborn Restaurant and First Avenue Hotel; still I must say that, in comparison with the glorious deep-coloured glass, these prose varieties are as reading mellifluous poetry to yourself in comparison with hearing divine music sung by a genius.

There is, however, one development that is absolutely new and lovely—three windows in the east aisles of Christ Church, Oxford, by Messrs. Morris, designed by Sir E. Burne-Jones. The upper tracery of one window is filled with sage-green foliage almost opaque at a distance, the tracery being only marked out by the white edges, so that our attention is not called away from the main subjects. In the lights are saints and prophets all in white, each one nearly filling the space between the mullions, the deepest colour being the flesh and hair, and all of them are crowned with streaky pink nimbuses; the figures are walking on yellow gravel, and the background is of drapery in indigo and dull red, and semi-opaque. The other windows have angels, wholly in white, whose blue wings form the background; below are slightly coloured subjects on a white ground. It is something to say that we have found an original genius in stained glass.

It is scarcely necessary for a rapturous admirer of stained glass, who never looks on the windows of Florence or Chartres without feeling that, if the dreams of youth could be realised, instead of being a saint, a hero, a poet, or a lawgiver, he would be a glazier, to consider such a thing, but there seems to be a notion that this word has something derogatory in it. No artist is shocked because he is called a painter, and it seems foolish when we have the word

"quince" to call it "an apple of Cydonia." The master glazier was once as well paid, and consequently as well thought of, as the master builder or architect, and is probably very much better paid now than the architect. You will bear with my being prolix and discursive if by so doing I can save hurting any man's feelings.

I think no painter but Mr. Dicksee has ever given us a stained-glass window in a picture, and it is curious if stained glass has appealed more to the poets than the painters, but it may be that these have felt how impossible it is to give this divinely coloured light. It is needless to say that the ordinary sketches, drawings, and chromolithographs only give vague hints of the colours; still in a manner they are useful and occasionally interesting. Some wags have published books of old stained glass where nothing is given but the outlines in black and white; as colour is *the* point in stained-glass we might as well have a book of the Greek statues in which the colour is given without the shape.

The poets have naturally been much struck with the beauty of stained glass. It is unnecessary to speak of Milton's "storied windows richly dight," or Tennyson's

And thunder-music, rolling, shake
The prophet blazon'd on the panes; *

for you all know them.

But possibly Keats's lines are not so well known:

And diamonded with panes of quaint device,
Innumerable of stains and splendid dyes,
As are the tiger-moth's deep-damask'd wings;
And in the midst, 'mong thousand heraldries,
And twilight saints, and dim emblazonings,
A shielded scutcheon blush'd with blood of queens and kings.†

Painters are nothing if they are not colourists, and I often wonder how it is that more of them do not turn glaziers, when I think of the delight magnificent stained-glass windows can bestow upon mankind; it is not only that they can give us a feast of colour unattainable by other means, but that there is an infinite field for scripture, historical, and portrait subjects that is unfortunately almost closed to any other form of art in which the noblest forms, the most subtle composition, and the most original harmonies may be indulged, if they will not forget that it is light they are dealing with and not a canvas, and remember Theophilus' remark that he had sought "by what subtlety of art and variety of colour a work may be adorned and may not exclude the light of day, nor the rays of the sun."

Painters do occasionally give cartoons, even coloured ones, but unless the painter is a glazier too the colour is not much more than a hint that the colours indicated may be tried, to see if they will make a harmony in glass. The cartoon will neither tell him how the colours will be mutually affected when the light streams through them, nor how the whole will look fifty feet above the eye; much less will it tell him how the window will look in sunshine. If it takes ten years at least to learn the art of using oil paint like a master, it is unlikely that to use coloured glass properly will come by instinct.

Although the designing and making stained and painted glass windows is artists' and not architects' work, I trust that the remarks I have made on this splendid adjunct to your buildings may not be looked upon by the architects as a useless waste of their time. It may afford too an almost unlimited scope to artists for employing their skill, from the slightest suggestion in enamel to the glorious richness of transcendental colour, and without debarring them from the use of noble form and masterly composition, if they will

* *In Memoriam*, canto 87, stanza 2.

† *The Eve of St. Agnes*, stanza 24.

only deign to consider that the paramount object, at least in the fuller variety, is lovely colour and not bad pictures.

Coloured glass is undoubtedly for the colourist the means by which the highest effects of colour may be reached, and for the lover of colour the means of producing a rapture that can only be compared to the analogous effect on musical devotees of the finest music without words.

There are some eloquent passages in the great Nathaniel Hawthorne's *Transformation*,* not only pointing out the unfadingness of stained glass as compared with fresco, but showing a passion for colour:—"In some of these holy edifices they saw pictures that time had not dimmed nor injured in the least, though they perhaps belonged to as old a school of art as any that were perishing around them. These were the painted windows; and as often as he gazed at them, the sculptor blessed the mediæval time, and its gorgeous contrivances of splendour; for surely the skill of man has never accomplished, nor his mind imagined, any other beauty or glory worthy to be compared with these.

"It is the special excellence of pictured glass, that the light, which falls merely on the outside of other pictures, is here interfused throughout the work; it illuminates the design, and invests it with a living radiance; and in requital the unfading colours transmute the common daylight into a miracle of richness and glory in its passage through the heavenly substance of the blessed and angelic shapes which throng the high-arched window.

"It is a woeful thing," cried Kenyon, while one of these frail, yet enduring and fadeless pictures threw its hues on his face, and on the pavement of the church around him,—"a sad necessity that any Christian soul should pass from earth without once seeing an antique painted window, with the bright Italian sunshine glowing through it! There is no other such true symbol of the glories of a better world, where a celestial radiance will be inherent in all things and persons, and render each continually transparent to the sight of all."

* "Transformation, or the Romance of Monte Beni." By Nathaniel Hawthorne. Vol. ii. pp. 285, 286.

Erratum.—Mr. Francis W. Bedford [F.] writes that the pulpit with porphyry work illustrated in the lecture on Marble [JOURNAL R.I.B.A., 17 October 1903, p. 531] is not at Ravello as there stated, but at the Cathedral of Salerno. This correction must serve also for plate v. of Mr. Wm. Brindley's Paper, "The Ancient Quarries of Egypt" [TRANSACTIONS R.I.B.A. N.S. Vol. IV. 1887-88], which is the original of the illustration in question, and which also describes the pulpit as of Ravello.—Ed.



ST. ALBAN'S CATHEDRAL: VIEW FROM THE NORTH-EAST BEFORE RESTORATION.

REVIEWS.

ST. ALBANS.

The Cathedral Church of Saint Albans. By the Rev. Thomas Perkins, M.A. Bell's Cathedral Series. 8s. Lond. 1903. Price 1s. 6d. [George Bell & Sons, York Street, Covent Garden.]

It is a quarter of a century since Lord Grimthorpe obtained his faculty to "restore, repair, and refit the church" of St. Albans, and even now it is difficult to write an unimpassioned account of the cathedral. In the volume before us—one of the well-known Cathedral Series of Messrs. Bell & Sons—the Rev. Thomas Perkins, M.A., has given us a brief but clear history from the earliest times. The book is divided into five chapters. Chapter I. deals with the history of the building; Chapters II. and III. with its plan and architectural features; Chapter IV. with the history of the monastery and see; and Chapter V. with some features of the neighbourhood.

Albanus, or Alban, was a young soldier who was put to death by the Romans, A.D. 303, on account of his affording shelter to a Christian deacon named Amphibalus, who taught him the Christian religion. He was beheaded on the hill overlooking the Roman town of Verulamium. The north transept of the present church is traditionally held to be the site of his martyrdom. A church was erected over the spot a few years afterwards, and Bede, writing in the eighth century, speaks of the original church existing in his

time. It seems more probable, however, that it was a later building of which the Saxon balusters in the existing building formed a part.

The church was rebuilt by the fourteenth abbot, Paul of Caen (1077-1088), largely from the remains of the old city of Verulam gathered together by his predecessors.

Abbot John de Cella (1195-1214) pulled down the Norman west front and partially erected a new one, which was completed by his successor. This beautiful Early English work was swept away by Lord Grimthorpe. Mr. W. S. Weatherley's sketch of the interior of the south-western porch as it appeared before restoration is given, and, if we remember rightly, careful measured drawings appeared in the *Spring Gardens Sketch-book*. At some unknown time the church or chapel of St. Andrew was built to the north of the nave for the use of the parishioners and rebuilt by John of Wheathampstead some time after 1451, but was destroyed at the Dissolution.

The author carefully traces the work done by the different abbots; and of Abbot John of Wheathampstead (1420-1440 and 1451-1464) he says: "For the most part his work was bad: he did almost as much to injure the abbey as the nineteenth-century restorers who swept away much of his work have done." This, we think, is too severe a condemnation, as Abbot John put up the fine painted ceiling over the presbytery, and it was in accordance with his plan (and probably design, as his arms appear on various parts of it) that the magnificent high altar screen was

erected by Abbot William of Wallingford (1476-1484).

After the dissolution of the monastery in 1539 the King granted the abbey to Sir Richard Lee, who demolished the monastic offices, sparing only the great gateway, which is now used as the Grammar School.

From the Dissolution up to 1856 is one long record of neglect and patching. A public footpath enclosed by walls was cut right through the church west of the Lady Chapel, the Lady Chapel itself being used as a school. An account is given of the various repairs to the church, first under Sir Gilbert Scott, and later by Lord Grimthorpe, whose puerile designs for the transepts call forth the author's well-deserved ridicule.

The orientation of the church is peculiar, the main axis pointing considerably to the south of east, which cannot have been due to the point of sunrise on the saint's day, which is 22nd June. We might mention, in this connection, that the other old churches of St. Albans, viz. St. Michael's, St. Peter's, and St. Stephen's, point in a similar direction.

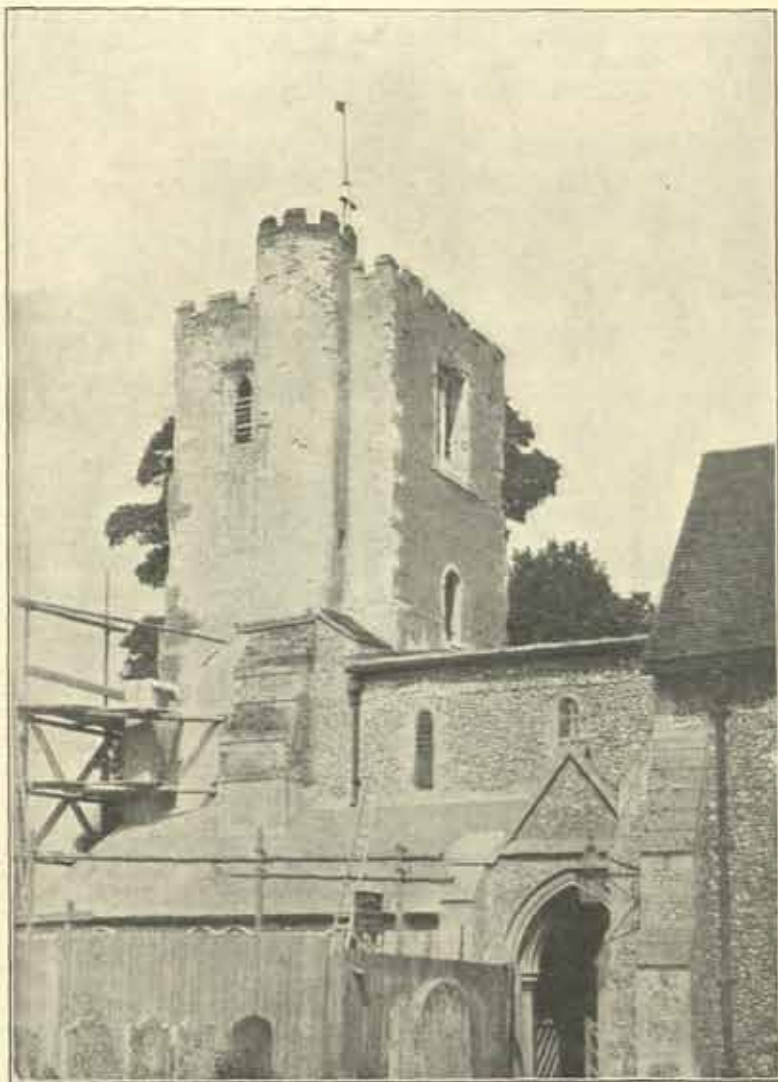
Mr. Perkins speaks of an old brazen font which once stood in the abbey as having been brought by Sir Richard Lee from Dunkeld. The inscription on it, however, stated that it was brought from Edinburgh, and Camden states that it was the font wherein the children of the kings of Scotland were wont to be baptized.

Chapter IV. contains a short history of the monastery, which belonged to the Benedictine order, and was founded by Offa II., King of the Mercians, in the year 793 as an act of atonement for his treacherous murder of Ethelbert, King of East Anglia. A useful list of the abbots, with the various works they did, is given.

About the year 950 Ulsinus, the sixth abbot, founded three churches on the highways facing the principal entrances to his monastery. As his own church was dedicated to the first English

martyr, it is worthy of note that he dedicated the three churches to St. Michael, the chief angel; St. Peter, the foremost apostle; and St. Stephen, the first martyr.

St. Peter's, which was Perpendicular in charac-



ST. MICHAEL'S CHURCH, ST. ALBANS: THE RECENTLY (1896) DEMOLISHED TOWER.

ter, has been practically rebuilt by Lord Grimthorpe, and now contains very little of interest.

St. Michael's Church, portions of which are Norman, stands within the site of Verulam. There is much of interest in the church, including a particularly fine Jacobean pulpit. Lord Grimthorpe destroyed the west tower in 1896 and erected a new one at the west end of the north aisle. Mr. Perkins is not correct, however, when he says it was a Saxon tower that was destroyed.

It was a Late Perpendicular one, which had been built inside the walls of an earlier tower, portions of which were still standing when the whole was demolished. The old tower, though not architecturally fine, was a well-known landmark and a beautiful bit of old colour.

The third church, St. Stephen's, also contains Norman work, and has an Early English south chapel. The old brass eagle lectern was probably part of the spoil brought from Holyrood by Sir

reproduced. A small plan of the cathedral is given at the end, which shows the general arrangement sufficiently clearly. We notice, however, a slip in the position of the reference letter F, which is supposed to mark the position of the Wallingford Screen, which is behind the high altar at the east end of the presbytery, whereas the letter has been placed at the position occupied by the rood screen, near the east end of the nave.

A. WHITFORD ANDERSON.



ST. ALBAN'S: SOUTH NAVE ARCADE, SHOWING JUNCTION OF THIRTEENTH AND FOURTEENTH-CENTURY WORK.

Richard Lee in 1544 when the Earl of Hertford sacked Edinburgh. It is inscribed "Georgius Creichtoun Episcopus Dunkeldensis." Mr. Perkins points out that there were two Bishops of Dunkeld bearing that name. We think, however, it was probably the George Crichton who was Bishop of Dunkeld from 1527 to 1543, as he had been previously Abbot of Holyrood, and is the prelate who is recorded to have "thanked God that he knew neither the Old nor the New Testament, and yet had prospered well enough all his days."

The book will prove a very useful and reliable guide to St. Alban's. It is plentifully illustrated with specially taken photographs, many of which are excellent as photographs and have been well

STRATFORD-UPON-AVON.

The Collegiate Church of Stratford-upon-Avon and other Buildings of Interest in the Town and Neighbourhood. By Harold Baker. With Fifty-eight Illustrations, chiefly from Photographs by the Author. 80. Lond. 1902. Price 1s. 6d. (George Bell and Sons, York Street, Covent Garden.)

Messrs. Bell are following up their well-known and useful "Cathedral Series" by uniform monographs of some of the most interesting churches not of cathedral rank. The church of the Holy Trinity, Stratford-upon-Avon, is one well worthy of inclusion in this list. "Stratford-upon-Avon," says Mr. Baker, "even if it were possible to imagine the quiet country town apart from the memory of its most celebrated son, would still be found full of charm. Standing in the rich, fruitful 'Heart of England,' through which flows one of the most beautiful rivers in the world, so typical in its quiet repose of our English country life, it is also full of architectural and historical interest. In addition to its large and beautiful church, its Guildhall, Guild Chapel, Grammar School, and other buildings connected with the guild life of the town, its streets of half-timbered houses, and its grand fifteenth-century bridge, it possesses one of the most complete series of town records in existence."

Mr. Harold Baker writes with both love and intimate knowledge of his subject, and has produced quite a model guide to all that is historically or artistically interesting in Stratford. His book is both full and accurate, well arranged, and clearly written. It is noticeable throughout for qualities of good taste and discrimination which lift it far above the level of the ordinary local guide-book. It is in fact the work of a thorough artist, as is further evidenced by the many excellent photographic illustrations, all done by the author, by which the little volume is enriched. Of guide-books to Stratford-upon-Avon the name is legion; of good ones there are few, and among these the present one is, for its size and price, the best.

ARTHUR S. FLOWER.



9, CONDUIT STREET, LONDON, W., 5th Dec. 1903.

CHRONICLE

THE NOVEMBER EXAMINATIONS.

Preliminary.

A Preliminary Examination, qualifying for Probationership R.I.B.A., was held simultaneously in London and the provincial centres indicated below on the 3rd and 4th ult. One hundred and seventy-one candidates were admitted, and 59 were exempted from sitting. The remaining 112 were examined, with the following results:—

District	Number Examined	Passed	Relegated
London	52	41	11
Birmingham	9	7	2
Bristol	14	9	5
Leeds	8	6	2
Manchester	23	19	4
Newcastle	6	5	1
	112	87	25

The following are the names of the successful candidates together with those exempted, making a total of 146 newly registered Probationers:—

ADAMSON: James Robertson; 5, Radnor Terrace, Dumbarton Road, Glasgow [Master: Mr. J. J. Burnett, A.R.S.A.*].
 AINSWORTH: Edwin; "Rodier," Revidge, Blackburn [Master: Mr. Duerden].
 ATTACK: George Albert Severne; 4 Saunders Road, Blackburn [Master: Mr. F. C. Ruddle].
 ATKEY: Reginald William; "Torfels," West Hill Road, Bournemouth [Master: Mr. Sydney Tugwell].
 BASKERVILLE: John Albert; 58 Halliwell Lane, Cheadam Hill, Manchester [Masters: Messrs. Chadwick & Booth].
 BEAUMONT: Eugene Edward; Harbledown, Manor Road, Sidcup, Kent [Master: Mr. E. C. Beaumont].
 BEECH: Frederick William; 19, Silverdale Road, Wolstanton, Stoke-on-Trent [Earl Granville's Endowed School].
 BELL: Douglas; 61 Gladstone Street, Scarborough, Yorkshire [Masters: Messrs. Cooper & Davis*].
 BLACKA: Charles Henry; Mayfield House, Garden Street, Todmorden, Yorks [Master: Mr. J. R. Blacka].
 BLOXAM: Owen Astley; c/o Mr. Stallard, Horton Crescent, Rugby [Rugby School].
 BOSS: Albert Henry; 108 Sewardstone Road, Victoria Park Gate, N.E. [Master: Mr. F. Nesbitt Kemp].

BOYES: Willie; Clifton Villas, Love Lane, Pontefract [Masters: Messrs. Garside & Pennington].
 BRACEWELL: Arthur; Thwaites, Keighley, Yorks [Master: Mr. Wm. Rhodes Nunns].
 BRIDGER: Robert Owen; 85 Goldhurst Terrace, South Hampstead, N.W. [Masters: Messrs. Spalding & Spalding*].
 BRITTAIN: Samuel Taylor; East Bank, St. Anne's Road East, St. Anne's-on-Sea [Collegiate School, St. Anne's].
 BURGESS: George Douglas; 8, Freeland Road, Ealing, W. [Master: Mr. H. W. Hetherington Palmer].
 BURLINGHAM: Alfred Claude; 22 Francis Road, Edgbaston, Birmingham [Masters: Messrs. Mansell & Mansell*].
 BURNETT: Frederick Wandlass; Jarrow House, Tondü, Bridgend, Glamorganshire [Master: Mr. E. W. Burnett].
 CAMERON: Kenneth; 4 Half Edge Lane, Eccles, Lancashire [Architectural School, Liverpool University].
 CAMPKIN: Dudley James; St. Moritz, Mulgrave Road, Sutton, Surrey [Masters: Messrs. George Elkington & Son*].
 CARGILL: Campbell Featherston; 198, Blyth Road, W. [Master: Mr. R. S. Warren].
 CART: Henry Philip Leopold; 47 Harclid Road, Upper Norwood, S.E.
 CARTER: John William, jun.; 47 Church Street, Rugby [Rugby School].
 CARUS-WILSON: Charles Denny; 10 Hillmorton Road, Rugby, Warwickshire [Rugby School].
 CASH: Rowland Walker; 9, Albany Place, Aberdeen [Master: Mr. A. Marshall Mackenzie, A.R.S.A.*].
 CATCHPOLE: Cyril; Russell House, Russell Road, Ipswich [Master: Mr. Raymond C. Wrinch*].
 CHERINGTON: Harry; 21 Lower Church Lane, Tipton, Staffs [Dudley Grammar School].
 CLARKE: Herbert, jun.; 31 High Street, Chelmsford, Essex [Masters: Messrs. Clare & Ross*].
 CLARKE: Henry Holland; South View, Severn Road, Weston-super-Mare [Masters: Messrs. S. T. Wilde & Fry].
 CLAY: Geoffrey Basil; 225 Gloucester Terrace, Hyde Park, W.
 CLUNIES-ROSS: George Dymoke; 6 Vigo Street, W. [Masters: Messrs. Edmund Wimperis* & Best*].
 COCKRILL: Kenneth Arthur; 139 High Street, Gorleston, Great Yarmouth [East Anglian School, Bury St. Edmunds].
 COLLINS: Philip John Langworthy; 20, London Road, Wembley, Middlesex [Master: Mr. G. A. T. Middleton*].
 COOK: James Arrowsmith; 87 Connaught Road, Cardiff [Master: Mr. Lennox Robertson].
 COOPER: Edward; 64, Cannon Street, E.C. [Master: Mr. Charles Henman*].
 COOPER: Frederic Roland; Southdene, Kettering [Master: Mr. A. E. Sawday*].
 DANIEL: Francis John; 8, Lydon Road, Old Town, Clapham [Masters: Messrs. Hazell & Son].
 DAVIES: Owen; 151, Forest Road, Walthamstow, E.
 DAY: Grahame Lerway; c/o Mr. F. Waterman, Elmstead, South Road, Taunton [Grammar School, Ealing].
 DOBSON: Joseph John; Front Street, Wingate Station [Master: Mr. J. J. Wilson].
 DUNCANSON: Edward Ford; Nutwood, Bickley Park, Kent [Master: Mr. John W. Simpson*].
 EBBS: Ralph Bertam Hall; "Tuborg," Durham Avenue, Bromley, Kent [Masters: Messrs. George Baines & Son].
 EDMONDS: Leonard William; 32 Old Park Avenue, Nightingale Lane, Balham, S.W. [Masters: Messrs. Treadwell & Martin*].

- EVANS: Roy; c/o Messrs. Young & Hall, 17 Southampton Street, Bloomsbury [Masters: Messrs. Young & Hall*].
- FERRIER: James Straton; 41, Heriot Row, Edinburgh [Master: Sir R. Rowand Anderson, * LL.D.].
- FINNING: Leonard John; Sand Rock, Pinhoe, Exeter [Master: Mr. F. J. Commin].
- FLANAGIN: Hugh William; Yorkville, Summer Hill [Master: Mr. Arthur Hill*].
- FLANIGAN: John Gerald; Crown Hotel, Great Victoria Street, Belfast [Master: Mr. W. J. Moore].
- FLOCKHART: William Stuart; 122 Gloucester Terrace, Hyde Park, W. [St. Peter's College, Westminster].
- FORSTER: Edward Harold; North Field, Thorne, Doncaster [Master: Mr. J. M. Dossor*].
- FRASER: Percy; 26, Killiesier Avenue, Streatham Hill [Master: Mr. Thomas Arnold*].
- FRENCH: Harold; Newton Garth, Hedon, near Hull [Master: Mr. B. S. Jacobs].
- FURNISS: Lawrence; 23 St. Edmund's Terrace, Regent's Park, N.W. [Master: Mr. T. B. Whinney*].
- GABBATT: Frederic Herbert Johnson; 3, High Street, Burton-on-Trent [Master: Mr. William Swindell].
- GILLESPIE: James; 3, Kinburn Terrace, St. Andrews, N.B. [Masters: Messrs. Gillespie & Scott].
- GLANFIELD: Ernest Budge; Fairholme, Chalvey Park, Slough, Bucks [University College School, London].
- GOODWIN: Bernard Malcolm; 16, South Park Hill Road, Croydon [Whitgift Grammar School].
- GREEN: John William; 113 Rock Street, Pitamoor, Sheffield [Master: Mr. H. I. Potter*].
- HALEY: Ernest; 172, Lloyd Street, Moss Side, Manchester [Master: Mr. Frank W. Mee*].
- HALL: Hubert; 150 Melbourne Road, Leicester [Master: Mr. A. E. Sawday*].
- HALL: Samuel; Oak House, 196 Wilmslow Road, Withington, near Manchester [Masters: Messrs. Mangnall & Littlewoods*].
- HARVEY: Walter; Cornwallis House, Cornwallis Gardens, Hastings [Master: Mr. Arthur Wells*].
- HASTIE: Thomas Little; 118, Onslow Drive, Dennistoun, Glasgow [Master: Mr. John Fairweather*].
- HAWKINS: Norman; 56 Eversfield Place, St. Leonards-on-Sea [Master: Mr. Arthur Wells*].
- HAYS: John Wilson; 6, Lake Bank, Station Town, Wingate, Durham [Master: Mr. H. T. Gradon*].
- HEPPEL: Francis Henry; South Lodge, Park Avenue, Worcester [Master: Mr. A. Hill Parker].
- HICKS: Lancelot Joseph; Egham Hill, Surrey (Nalvern College).
- HODDER: Eric Edwin; Guildfordene, Whitehall Road, Thornton Heath [Master: Mr. John Wills].
- HOLLINS: George; 4 Market Place, Newcastle, Staffs [Masters: Messrs. Lynam, Beckett & Lynam*].
- JACKSON: Thomas Gordon; 103, Abbeville Road, Clapham Common, S.W. [Masters: Messrs. Cooper & Taylor].
- JEFFERIES: Herbert George; Fowey Villa, Queen's Road, Springfield, Chelmsford [Master: Mr. F. Whitmore].
- JOHNSON: Arthur William; 19, St. James's Street, Sheffield [Master: Mr. Chadfield*].
- JONES: Cyril Montagu; 27 Regent Street, Swindon, Wilts [Master: Mr. Ellis H. Pritchett*].
- KAYE: Stewart; 34 Bondgate Without, Alnwick [Master: Mr. G. Reavell, jun.*].
- KING: George Grant; Ardara, Cultra, Belfast [Master: Mr. J. St. J. Phillips*].
- KNOOP: Robert; Royal Grammar School, Lancaster.
- KNOX: Alexander Neilson; 1, Bute Gardens, Glasgow [Master: Mr. Andrew Balfour].
- LAWSON: Maurice Bertie; 15a South Villas, Camden Square, N. [Master: Mr. George Elkington*].
- LAY: Cecil Howard; School House, Henley Road, Ipswich [Queen Elizabeth School, Ipswich].
- LEGGE: Benjamin; 7, London Road, St. Albans, Herts [Master: Mr. P. C. Blow*].
- LEIGH: Douglas Chantler; Elm Grove, Winsford, Cheshire [Masters: Messrs. Wm. * & Segar Owen*].
- MARTIN: John Gray; 249 Park Road, Oldham [Master: Mr. Thomas Hilton].
- MASON: Frederick Charles; Gerrard's Lodge, Banstead, Surrey [A. A. Day School].
- MOIR: David James; 349, High Street, Perth, N.B. [Masters: Messrs. MacLaren & Mackay].
- MOORE: Thomas Sydney; 11, Selby Terrace, Maryport, Cumberland [Masters: Messrs. Oliver & Dodgshun*].
- MUNNION: Harold Arthur; "Avondale," Sibella Road, Clapham, S.W. [Masters: Messrs. Mackintosh & Newman].
- NASH: Bernard Owen; 2, Buxton Road, Brighton, Sussex [Master: Mr. Leslie W. Green*].
- NIEMANN-SMITH: Hubert; Clevedon, Lewisham Hill, S.E. [Masters: Architectural School, King's College].
- NURSE: Henry; 28 Northfield Terrace, Eastmoor Road, Wakefield, Yorkshire [Master: Mr. Henry Crutchley].
- ORCHARD: Charles Robert; 71 Pennsylvania Road, Exeter [Master: Mr. James Jerman*].
- PARACOTT: Horace Walter; The Ferns, 15, Laurel Grove, Penge, S.E. [King's College Architectural School].
- PARR: Edward; 23, Peel Street, Sunderland [Master: Mr. Joseph Spain*].
- PERRIN: Alfred John; "Buckwood," 57 Underhill Road, Dulwich, S.E. [Master: Mr. Charles E. Barry*].
- PICKMERE: Travers; 4, Alexandra Drive, Prince's Park, Liverpool [Master: Mr. Thomas Sheldermine].
- PORTEOUS: James Vincent Roy; "Avondale," Lytham, Lancs [Pembroke House School, Lytham].
- PRESTWICH: Lewyn James; 25, Amphill Square, N.W. [Master: Mr. W. G. Wilson*].
- RAVENSCHROFT: Joseph Henry; Helaton, Mossley Hill, Liverpool [Masters: Messrs. Woolfall & Eccles*].
- RIGG: William Arthur; Oxford Street, Carnforth, Lancs [Friends' School, Lancaster].
- ROESCHER: Cecil William; 2 Wilford Lane, West Bridgford, Nottingham [Masters: Messrs. A. R. Calvert & William R. Gleave*].
- ROLLIN: Percy William; 28, St. Dunstan's Road, West Kensington [Master: Mr. H. T. Gradon*].
- ROSE: Winter; Ivy House, Ashburnham Road, Bedford [Masters: Messrs. Usher & Anthony].
- SCATCHARD: Fred; "Beckfield," Barnes Road, Castleford [Master: Mr. Arthur Hartley].
- SCHOFIELD: John Frank; 49 Bow Road, E. [Master: Mr. A. E. Habersham*].
- SCOTT: Ernest Albert; 161 Old Kent Road, S.E. [Master: Mr. Alfred W. S. Cross*].
- SEATON: James Arnold; Pembroke House School, Lytham.
- SELLECK: George Brooking; 2, Green Bank, Plymouth, Devon [Master: Mr. B. Priestley Shires*].
- SMITH: Gerald Parker; Feron Hall, Tonbridge [Tonbridge School].
- SMITH: Roland Ingleby; Eastlen, Whitecross Road, Weston-super-Mare [Master: Mr. Hans F. Price].
- SMITH: Stephen Percy, B.A. Oxon; c/o S. E. Smith, Esq., 12, South Parade, Leeds [Master: Mr. Stephen Ernest Smith*].
- SOUTHON: Harold; 5, Carmalt Terrace, Putney, S.W. [King's College School].
- STANLEY: Joseph Weston; 2 Hyde Place, C.-on-M., Manchester [Masters: Messrs. Alker & Bowden].
- STEPHENS: William Leslie; Dobwalls, Liskeard, Cornwall [Master: Mr. T. R. Kitsell*].

STEVENS: Edgar; 21 Alexandra Place, Newcastle-on-Tyne [Master: Mr. S. S. Stallwood].

SWALES: Thomas Mason; Greenfield House, Upper Holland, Wigan.

TASKER: William Watt; Dunblane House, North Shields [Masters: Messrs. Mould & Tasker].

TAYLOR: Robert Henry; 34, Atholl Street, Perth, N.B. [Master: Mr. A. G. Heiton].

THOMPSON: Thomas William; Deafhill Terrace, Trimdon Colliery, B.S.O., Durham [Master: Mr. Fred Wiley].

THOMSON: David Halton; Dartmouth Tower, Dartmouth Park Hill, N.W. [Highgate School, London].

THORNE: Harman; Ashcroft, Barnstaple [Master: Mr. Arnold Thorne*].

THORPE: Sidney Hubert; Ringwood, Anson Road, Tufnell Park, N. [Masters: Messrs. Thorpe & Furniss].

TOMKINS: Hugh Charles; Millbrooke House, Newport, I.W. [Master: Mr. S. E. Tomkins].

TRAVIS: Arthur; 27 Todmorden Road, Littleborough, near Manchester [Master: Mr. F. W. Dixon].

VELASCO: Lucio; 170, Holland Road, Kensington, W. [Masters: Messrs. Banister Fletcher & Sons*].

WADE: Albert Lavian; The Orchard, Dulwich Common, S.E. [Dulwich College].

WALGATE: Charles Percival; Norwood, Beverley, Yorks [Masters: Sir Alfred Gelder & L. Kitchen*].

WARRY: John Lucas; 2 Cobham Road, Wood Green, N. [Master: Mr. Percy Green*].

WATERHOUSE: Gilbert; 46 Forest Drive, Leytonstone, N.E. [Master: Mr. W. Stair].

WATSON: Walter Clarence; Lincoln House, York Road, West Hartlepool [Master: Mr. T. N. Walton].

WEARING: Stanley John; 16, Highfield Street, Leicester [Masters: Messrs. Coates & Johnson].

WEBBER: Henry Stanton; Public Works Department, South Africa [Masters: Messrs. J. R. Cooper & Sons].

WEBBER: Sidney Joseph; 14, Craufurd Rise, Maidenhead, Berks [Masters: Messrs. Davy & Salter*].

WELBURN: Thomas Gordon; Greenfield House, Campbelltown [Master: Mr. Andrew Balfour].

WESTON: Ernest; 62 Egerton Road, North Shore, Blackpool [Master: Mr. T. G. Lamb].

WESTON: Ernest Arthur; 15, Ainger Road, N.W. [Masters: Messrs. Banister Fletcher & Sons*].

WESTWORTH: Alfred Robert; 78 High Street, Sydenham, S.E. [Master: Mr. George Tolley].

WHIDDINGTON: William Arthur; 71 Queen Street, Cheapside, E.C. [Master: Mr. W. Whiddington].

WHITEHEAD: John Edmund, jun.; 22, High Street, Sheffield [Masters: Messrs. C. J. Innocent & Son*].

WHITTAKER: Thomas Herbert; 15 Trent Boulevard, W. Bridgford, Nottingham [Master: Mr. H. Tatham Sudbury].

WILLAN: William Staveley; 7 Bowling Green Road, Kettering, Northants [Masters: Messrs. Gotch* & Saunders].

WILLEY: Hugh Henry Scott; Somersfield, Reigate, Surrey [A. A. Day School].

WILSON: Arthur Gordon; Hill Cottage, Tayport, Fife-shire [Master: Mr. James Findlay].

WILSON: Geoffrey Cecil; "Renby," 45 High Road, Streatham, S.W. [Eastbourne College].

WINTER: Cecil R.; 51, High Street, Hucknall Torkard, Notts [Master: Mr. W. D. Pratt].

WORSLEY: Nicholas; The Gables, Park Avenue, Blackpool [Master: Mr. James H. Mangan].

YEOMAN: Guy Hemingway; 10 Shrubbery Road, Streatham, S.W. [Master: Mr. Arthur Keen].

YOUNG: Allan Murray Campbell; 135 Kennington Road, Lambeth, S.E. [Masters: Messrs. Green, Abbott, & Elliot].

The asterisk (*) denotes members of the Institute.

Intermediate.

The Intermediate Examination, qualifying for *Studentship R.I.B.A.*, was held simultaneously in London, Bristol, Leeds, and Manchester on the 3rd, 4th, 5th, and 6th ult., with the following results:—

District	Number Examined	Passed	Relegated
London	74	39	35
Bristol	5	3	2
Leeds	11	6	5
Manchester	14	5	9
	104	53	51

The following are the names of the passed candidates, given in order of merit as placed by the Board of Examiners:—

MOORE: Leslie Thomas [Probationer 1899]; 14, Great Ormond Street, W.C. [Master: Colonel Edis, C.B.].

BATLEY: Claude [Probationer 1898]; Rose Valley, Brentwood, Essex [Master: Mr. G. W. Leighton].

LAMONT: Alexander Hay [Probationer 1902]; 24, Millar Crescent, Morningside, Edinburgh [Master: Mr. George Craig].

SOLOMON: Digby Lewis [Probationer 1902]; 21, Hamilton Terrace, N.W. [Master: Mr. Lewis Solomon*].

STOCKDALE: William [Probationer 1900]; 19, Waterville Road, North Shields [Masters: Messrs. Thomas A. Page & Son].

SHACKLETON: Harry [Probationer 1901]; 7, Redcliffe Street, Kelghley [Masters: Messrs. W. H. & A. Sugden].

HUMPHRY: Harold Walter [Probationer 1902]; 2, Grand Parade, Bournemouth West [Masters: Messrs. Fogarty & Parnell].

GOLDING: Herbert Haylock [Probationer 1902]; 56, Plum Lane, Plumstead, Woolwich S.E. [Master: Mr. H. Shaw].

HILLERNS: Oswald Hero Wilhelm [Probationer 1904]; Oldenburg Villa, Hesse, E. Yorks [Master: Mr. B. S. Jacobs].

ATKINSON: Archibald Harvey [Probationer 1898]; 81, Kyrle Road, Clapham Common, S.W. [Master: Mr. F. G. Knight*].

WILLMOTT: Edmund Charles Morgan [Probationer 1900]; 197, Richmond Road, Cardiff [Masters: Messrs. Habershon, Fawcner & Co.].

DYER: Frank [Probationer 1898]; 167, Chorlton Road, Brooks's Bar, Manchester [Masters: Messrs. Booth, Chadwick* & Porter].

GOULDER: Arthur Christopher [Probationer 1900]; Woodbury, Woodford Green, Essex [Masters: Messrs. Banister Fletcher & Sons*].

HORSFIELD: John Nixon, jun. [Probationer 1901]; 11, Penrhyn Road, Kingston-upon-Thames [Master: Mr. Nixon Horsfield].

TURPIN: Wilfrid [Probationer 1900]; Park View, Roker, Sunderland [Master: Mr. Joseph Spain*].

DALE: Thomas Lawrence [Probationer 1900]; Home Farm, Mildenhall, Marlborough, Wilts [Master: Mr. Charles E. Ponting].

MUFF: Edward Brantwood [Probationer 1899]; The Red House, Bexley Heath, Kent [Masters: Messrs. W. A. Pite* and R. S. Balfour*].

HOPE: Peter Ballingall Malcolm [Probationer 1900]; 111, Fentiman Road, Clapham Road, S.W. [Masters: Messrs. Houston* & Houston*].

TEMPEST: Frederick William [Probationer 1901]; 33, Kirkby Road, Sutton-in-Ashfield, Notts [Master: Mr. E. Bryan Dean].

THOMAS: Robin Audrey [Probationer 1901]; 60, St. Andrew's Road, Southsea, Hants [Master: Mr. Norman Atkins].

SWINDELLS: Harry Cecil [Probationer 1903]; "Burnthorpe," Fairfield, near Manchester [Master: Mr. Joseph Swarbrick*].

DURSTON: Cecil Campbell [Probationer 1901]; "Manordene," Bristol Road, Weston-super-Mare [Masters: Messrs. Hans Price & W. Jane].

BAMFORD: Dennis [Probationer 1902]; c/o Edgar Wood, Esq., 78, Cross Street, Manchester [Master: Mr. Edgar Wood*].

BARRETT: Willis Theodore McNaghten [Probationer 1900]; Etruria Vicarage, Stoke-on-Trent [Masters: Messrs. Lynam,* Beckett,* & Lynam].

BUCK: Roland James [Probationer 1902]; "Sunny Hill," Hurst Road, Horsham [Master: Mr. Banister Fletcher*].

BULLOCK: Archibald [Probationer 1902]; 99, Amesbury Avenue, Streatham Hill, S.W. [Masters: Messrs. Niven* & Wigglesworth*].

CLAY: Herbert [Probationer 1901]; 1, Ruskin Street, Gainsborough [Master: Mr. Henry J. Copley].

COCKER: John [Probationer 1901]; "Oakwood," Park Road, Timperley [Master: Mr. J. T. Ashton].

DAVIDSON: John [Probationer 1894]; "Elderslie," Loughton, Essex [Master: Mr. Banister Fletcher*].

EDWARDS: Arthur Cecil Morris [Probationer 1901]; Bank House, Rickmansworth [Master: Mr. Arnold Mitchell*].

FORSTER: Douglas Alfred [Probationer 1900]; Fernlands, Chertsey, Surrey [Masters: Messrs. Banister Fletcher & Sons*].

HAYWORTH: Dudley Parkes [Probationer 1900]; 91, Cazenove Road, N. [Master: Mr. F. Lindus Forge].

HITCHINS: Walter William [Probationer 1900]; 12, Wyndham Square, Plymouth [Master: Mr. B. Priestley Shires*].

HOHNFELDT: Arnold Pearson [Probationer 1901]; c/o Dr. Fairbank, Boulevard, Hull [Master: Mr. John M. Dossor*].

HEWITT: Claude Elborne [Probationer 1900]; "Riseholme," Bolsover Gardens, Sherwood Rise, Nottingham.

INGRAM: Thomas Frederick [Probationer 1900]; 13, Westfield Grove, Wakefield [Masters: Messrs. W. & D. Thornton].

JAQUES: Sydney [Probationer 1901]; 143, Osborne Road, Forest Gate, E. [Master: Mr. F. J. Sturdy*].

JOHNSTON: Reginald [Probationer 1899]; 50, Moorgate Street, E.C.

KILLBY: Ashley Searlett [Probationer 1901]; 10, Aberdeen Park, Highbury, N. [Master: Mr. John W. Simpson*].

MURCH: Spencer Harris Joseph [Probationer 1900]; "Oakhurst," Loughton, Essex [Master: Mr. James Farley].

MYERS: John [Probationer 1899]; 33, Randolph Crescent, Maida Vale, W. [Master: Mr. Delissa Joseph*].

MYERS: Legend William [Probationer 1902]; 20, St. Andrew's Street, Cambridge [Masters: Messrs. MacAlister* & Tench*].

PATERSON: William Esson [Probationer 1900]; The Shrubbery, Gloucester Road, Cheltenham [Master: Mr. R. Hooper Turner].

PETO: Gilbert Eyre [Probationer 1901]; 6, Alfred Street, Bath [Master: Mr. W. J. Willcox].

PIERCE: Arthur Patrick Hector [Probationer 1901] [Auckland, New Zealand]; 33, Steele's Road, Hampstead, N.W. [Master: Mr. R. Langton Cole*].

ROBINSON: Archibald Hurley [Probationer 1901]; 24, Soho Road, Handsworth, Birmingham [Masters: Messrs. Oliver Floyd & Salt].

ROE: Cyril Kenneth [Probationer 1901]; 80, Lexham Gardens, Kensington, W. [Master: Mr. W. D. Carle*].

TASKER: Harry Francis [Probationer 1900]; Maryon Hall, Frognal Lane, Hampstead [Master: Mr. Francis W. Tasker*].

TUCKER: Alfred Nicholson [Probationer 1900]; c/o A. S. Parker, Esq., 20, George Street, Plymouth [Master: Mr. Arthur S. Parker*].

WATKINS: Thomas William [Probationer 1899]; 29, Harrington Gardens, S. Kensington [Master: Mr. R. Philip Day*].

WICKENDEN: Arthur Fred [Probationer 1899]; City Engineers' Department, Town Hall, Hull, Yorks. [Master: Mr. Wm. Harmer].

WILSON: John Archibald [Probationer 1902]; 10, Artesian Road, Bayswater, W. [Masters: Messrs. Stevenson* & Redfern*].

WOOD: Cecil Walter [Probationer 1903]; 19, Charing Cross Road, W.C. [Master: Mr. F. Strouts,* New Zealand].

The asterisk (*) denotes members of the Institute.

The following Probationers who have attended the full two years' course in architecture at University College, Liverpool, and have obtained a first-class certificate at the College Final Examination, were, on the recommendation of the Board of Examiners, exempted from sitting for the recent Intermediate Examination, and have been admitted as *Students R.I.B.A.*, the work done them during the Session having been approved the Board as Testimonies of Study:—

BARMISH: Leonard [Probationer 1902], 22 Aughton Road, Birkdale, Southport.

BIRCH: John Godfrey Corville [Probationer 1903], Chester.

HONEYBURNE: Ernest Hardy [Probationer 1902], 23 Duke Street, Southport.

LEWIS: John Norman [Probationer 1902], 22 Gt. George's Road, Waterloo, Liverpool.

CAMERON: Kenneth [Probationer 1903], 4 Half Edge Lane, Eccles, Lancs.

Final.

The Final Examination, qualifying for candidature as *Associate R.I.B.A.*, was held in London from the 13th to the 20th ult. Forty-nine candidates were examined, and the following twenty-two passed, the others being relegated to their studies:—

ASMAN: Herbert Wilson [Probationer 1898, Student 1901]; 30 Randall Terrace, Heaton, Bradford.

BRIGHT: Lawrence Lee [Probationer 1895, Student 1899]; 9 St. Peter's Church Walk, Nottingham.

CASTELLO: Manuel Nunes [Probationer 1899, Student 1900]; "Hazeldean," Sydenham Hill, S.E.

CUBITT: Horace William [Probationer 1897, Student 1899]; 163 Grosvenor Road, S.W.

DAVIDGE: William Robert [Probationer 1898, Student 1900]; The Architects' Department, London County Council, 19 Charing Cross Road, W.C.

DELBIDGE: William John [Probationer 1899, Student 1901]; 40 Egerton Road, Greenwich, S.E.

DYKES: George, jun. [Probationer 1894, Student 1902]; "Wiston," Holmhead Road, Cathcart, Glasgow.

FOWLER: Henry Tutty [Probationer 1892, Student 1894]; Bamsden Square, Barrow-in-Furness.

GUNN: Edwin George Harry [Probationer 1899, Student 1901]; 18 Larch Road, Cricklewood, N.W.
 HALL: Herbert Alfred [Probationer 1899, Student 1900]; The Old Park, Southgate, N.
 HEMINGWAY: Willie [Probationer 1893, Student 1900]; Brynderwen House, Dorset Street, Bolton.
 HOBBISS: Holland William [Probationer 1897, Student 1899]; 6 Gordon Place, Kensington, W.
 JOHNSON: Frank Garfield [Probationer 1893, Student 1902]; 27 Estelle Road, Hampstead, N.W.
 LEE: John Stevens [Probationer 1893, Student 1895]; 28 Theobald's Road, W.C.
 MACKENZIE: Henry Blinman [Probationer 1897, Student 1899]; Lochbroom House, Senghennydd Road, Cardiff.
 NEWMAN: Francis Winton [Probationer 1895, Student 1897]; 31 Savernake Road, Hampstead, N.W.
 PRITCHARD: Henry Melancthon [Probationer 1900, Student 1901]; 153 Mackintosh Place, Roath, Cardiff.
 ROBINSON: Thomas Henson [Probationer 1895, Student 1899]; 64 Redcliffe Road, South Kensington, S.W.
 BOLLO: Andrew [Probationer 1897, Student 1900]; 11 Little College Street, Westminster, S.W.
 RUSSELL: George Leonard [Probationer 1897, Student 1899]; Hainault House, Meynell Road, Hackney Common, N.E.
 STONE: Henry Walcott [Probationer 1900, Student 1901]; 9 The Avenue, Taunton.
 WOOD: Joseph John [Probationer 1897, Student 1899]; 27 Cardigan Road, Leeds.

The following shows the number of failures in each subject of the Final:—

I. Design	19
II. Mouldings &c.	21
III. Materials	9
IV. Sanitation	13
V. Specifications	8
VI. Construction: Foundations, Walls, &c.	10
VII. Construction: Iron and Steel &c.	11

The Ashpitel Prize.—On the recommendation of the Board of Examiners the Council have decided to award this Prize to Mr. Francis Winton Newman [Probationer 1895, Student 1897], he being the candidate who has most highly distinguished himself in the Final Examinations held during the current year.

The Intermediate Examination and the Victoria University, Manchester.

Subjoined is a minute of the proceedings of the Senate of the Victoria University, Manchester, a copy of which has been forwarded to the Institute by the Registrar of the University. The resolution passed by the Senate has been concurred in by the Council of the University.

Read: A letter from the Secretary of the Royal Institute of British Architects stating that the Institute would exempt from their Intermediate Examination those students who had passed through the Architectural course, on the following conditions:—

"(1) That a candidate should have passed or have been exempted from the Preliminary Examination of the Institute.

"(2) That the drawings prepared by the candidate during his two years' course be approved by the Board of Examiners of the Institute.

"(3) That the candidate shall have obtained a first-class certificate at the College Final Examination.

"(4) That a member of the Board of Examiners of the Institute be associated with the Professor in the Examination.

"Resolved—

"That the Senate expresses its satisfaction at the proposals and agrees to the first three conditions on the understanding that either a first-class in the Terminal Examinations of the final year or the passing of a University Degree Examination in Architecture would satisfy condition (3); as regards condition (4) they would concur with the proposals that a Member of the Board of Examiners of the Institute should be associated with the Professor in the Terminal Examinations, and that if University Examinations are included under the fourth condition, the Senate, while unable to pledge itself to carry out the proposal, would bear it in mind, making the appointment of external examiners in Architecture."

On the recommendation of the Board of Examiners the Council of the Institute have resolved to comply with the suggestions of the University.

Liverpool Cathedral Competition.

At the conclusion of the official business before the General Meeting last Monday, Mr. William Woodward [A.] brought forward the matters of which he had given notice, and which were printed in the Agenda of the Meeting issued to members on the 21st ult.—viz. "that at this meeting he would direct attention to the proceedings of the two Assessors in the recent Liverpool Cathedral Competition, and move the following Resolutions:—

"1. That this Meeting condemns the action of the Assessors in giving the first place in the final competition to a set of drawings which did not comply with the essential condition of the Competition.

"2. That this Meeting views with the greatest disfavour the action of one of the Assessors in allowing himself to be associated with the selected competitor in the carrying out of the work."

Mr. WM. WOODWARD said he proposed to move and speak to the Resolutions separately, and having read the first Resolution he went on to say that he offered no apology whatever for introducing the subject. With such an important competition as that for an English cathedral, and with two such distinguished Assessors as Mr. Bodley and Mr. Norman Shaw, there must necessarily attach more

interest to the subject than would otherwise be the case. He proposed first to draw attention to the facts connected with this competition. As regards the former competition he had nothing to say except that Mr. Bodley was one of the competitors. On the 28th October 1901 the Cathedral Committee issued an amended notice to architects inviting them to send in drawings for the Cathedral on or before 30th June 1902. The notice was framed in very ambiguous terms, and resulted in an exhibition of the most amusing collection of drawings it was possible to imagine. He had himself spent some hours in carefully examining them, and he agreed with the Assessors that many of the competitors had taken no pains to visit the site, and no pains to design a cathedral; some merely sent in rough sketches of works already executed, and some were of a very trivial character. The Cathedral Committee further stated that they would carefully examine the portfolios with the assistance of professional assessors, and would select a limited number of architects for the final competition. The professional Assessors selected were Mr. G. F. Bodley, R.A., and Mr. Norman Shaw, R.A. In August 1902 the Assessors issued their Report on the designs submitted in the preliminary competition. There were the following passages in this Report to which he desired to direct special attention. The Cathedral, the Assessors say, "must be suitable for the services of the English Church, and be capable of holding a large congregation." They add: "All this is obvious; that the authors of the selected design should be invited to compete for the great work in accordance with regulations that may be laid down for their guidance, and that the Cathedral must be fitted for the requirements of the present age." The Assessors go on to state that they have selected five who they consider are shown by their designs to be capable men; further, they state: "These five we suggest should be asked to prepare complete designs for the Cathedral in accordance with the conditions to be laid down by the Committee." Under date 6th October 1902, the Committee issued what are headed "Instructions and Conditions to be Observed by Competing Architects"; and they state that designs will be liable to be excluded from the competition if "(b) in the opinion of the Committee the conditions or instructions are violated, and (c) if the designs do not provide substantially the accommodation asked for." Then there is this important announcement under Clause 7: "The Committee suggest that the central space at the crossing of the nave, transepts, and choir should be large and fully capable of seating 3,000 persons (without any interruption of the view from columns), either in the form or plan of an octagon, circle, or other design as thought best by the architect, due consideration being given to the acoustic properties of the building." Clause 20 states that "it is intended that the author of the selected design shall be engaged to carry out the buildings unless the Committee see reasons to the contrary on the condition hereafter stated." Clause 21 states that "each architect sending in a complete design, in accordance with the above instructions, will be paid an honorarium of 300 guineas, whether selected or not. The Committee may at any time, on the payment of a further sum of 2,000 guineas to any of the architects, retain the whole of his drawings and designs submitted in the competition, which shall then become the absolute property of the Committee." It would be observed that the Committee did not really bind themselves to employ an architect. The design selected by the assessors was that of Mr. Gilbert Scott, a gentleman of whom he spoke with the utmost regard and respect, not only for the design he sent in, but for the association of his talented and artistic family. He wished it to be clearly understood that in whatever he had to say that evening there was not the slightest idea of calling in question the honour of either Mr. Bodley or Mr. Norman Shaw. That was not the question. The great principle

they had to discuss was whether or not some laxity had occurred—a laxity certainly on the increase in architectural competitions—and whether it was not proper at once to call attention to that laxity, so that there might be more direct thought given by the Assessors to the conditions and instructions laid down by the promoters. Mr. Gilbert Scott, whose design was selected, was a young architect of twenty-three years of age; and it must have been obvious to the Assessors at once that Mr. Scott at that age was not capable of carrying out the design for the Cathedral: a design which demanded in the architect great knowledge of construction and great knowledge of building. Certainly at the age of twenty-three that knowledge could not possibly have been attained by any man. However, his design was selected. As regards the action of the Assessors, he intended to call the attention of the Meeting to one important point. Every architect knew that if he set himself down to design a cathedral where the preacher was to be seen and heard by 3,000 persons, that idea must dominate the entire design and have great effect upon the whole of his conception. Those who had seen Mr. Scott's plan would agree with him that it was of an ordinary character. It had its aisles, its nave, its transepts, its choir; there had been no attempt whatever in that plan to carry out the fundamental condition laid down by the Committee, that there should be a large preaching or congregational area. In his view a competition of this kind was to all intents and purposes a contract between the Committee and the competitors. The requirements of the Committee are clearly laid down in the Conditions which the Assessors had before them when they adjudicated upon the final competition. In Mr. Scott's plan, however, there was nothing like accommodation provided for 3,000 persons to see and hear the preacher. Give Mr. Scott's plan the benefit of as much space as they liked surrounding the pulpit, not half the number of persons required by the conditions would be able to see or hear the preacher. That being so, he held, without the slightest hesitation, that it was the duty of the Assessors to have set aside that plan at once, however beautiful the rest of the Cathedral might have been. However skilful Mr. Scott might have been in his designs, there was only one duty for the Assessors, and that was to declare that this design did not comply with the express conditions laid down by the Committee, and Mr. Scott would be entitled to the solatium of 300 guineas. The Assessors, too, had this opportunity, which they might very well have taken advantage of: they might have said to the Committee, "Here is a design submitted by a very young man; even supposing he complied with the conditions we know he is not capable, through his want of knowledge of construction, of carrying out such a large building as this: let him have the 2,000 guineas you have referred to and let there be another competition, and restrict that competition to men who you know are capable, if they are selected, to carry out their design." That would have been a far better line of conduct than that adopted by the Assessors. Touching the other point he had referred to, the condition of this competition amounted to a contract with the competitors, and he was not sure whether the latter had not a right of action against the Cathedral Committee. The competitors had expended time and money in responding to the Committee's invitation; they had carried out their part of the contract, and they might very fairly look to the Committee to carry out theirs. It would be well worth a test as to whether a committee who knowingly broke an essential condition in the contract between themselves and the competitors would not be open to an action at law. The Committee evidently knew and found out their mistake, because in *The Times* of the 16th May last it is reported: "The Committee decided that they could not accept any of the designs recommended by the Assessors," and they go on to say: "It is recalled that in drawing up

the conditions of the competition the Committee made a strong point of securing ample accommodation within sight of the preacher for a large congregation in the proposed Cathedral. The design No. 1 approved by the advisory architects does not appear to the Committee capable of fulfilling this condition." The Committee evidently at once saw that the essential condition of their requirements had not been complied with, and they said so in very distinct terms. The report of the assessors appeared in *The Times* of the same date, and they make one or two observations which he would read. They say: "The real effect of the building rising to its final completion," &c., &c. Then again: "Lastly, we had to look for that power, combined with beauty, that makes a great and noble building." Then they add: "In the set of drawings marked 'No. 1' (Mr. Gilbert Scott's) we find these qualities pre-eminently shown. We cannot but give it the first place." Then a somewhat startling transformation took place. On the 15th May, it would be remembered, the Committee rejected the whole of the designs, and particularly that selected by the Assessors. But on the 26th of the same month (according to *The Times* of the 27th), at a special meeting, after a long discussion, it was resolved that "Mr. G. F. Bodley, R.A., and Mr. Gilbert Scott be approached with a view to their appointment as joint architects of the proposed Liverpool Cathedral, and that the design marked No. 1 be selected, subject to the above arrangement, and to such alterations and modifications as may be advised by the architects and approved by the Committee." That particular portion of the Report, however, came under his second Resolution, and he would leave that for the present. What he desired to repeat was this: The Assessors were to be distinctly blamed; they had shown a lamentable laxity in the selection of a design which obviously failed to comply with the most essential condition of the competition. The result was therefore unfair, distinctly unfair, to the competitors who had based their designs on the necessity for providing this large preaching or congregational area. The anxiety, the loss of time and money caused to the competitors had all been thrown away by the action of the Assessors; and he sincerely trusted that members would show by their votes that this laxity ought not to be allowed to continue. It was the more necessary that they should show this by their votes, because of the importance of the Cathedral and of the eminent position occupied by the two Assessors. The speaker then moved his first Resolution.

Mr. A. W. S. CROSS [F.] in seconding the Resolution expressed his regret that he was unable to support the views which he believed the Council held—viz. that in consequence of their artistic achievements the two gentlemen whose conduct had been called in question that evening ought not to be censured by the Institute.

Mr. LEONARD STOKES [F.] said he was a member of the Council, and he certainly was not aware that they held any such views.

Mr. CROSS, continuing, said that in his opinion it was the bounden duty of the Council to take some decisive action directly this flagrant violation of the Institute's regulations was first brought to its notice. It was most unfortunate for the prestige of the Council that it should be left to a member outside the governing body to show the Assessor in question that the Institute deprecated his action in contravening regulations framed to apply equally to all its members, whether they be great and eminent architects, or young and comparatively unknown.

Mr. SYDNEY VACHER [J.] said he thought it most unfortunate that the Rules of the Institute allowed Mr. Woodward to bring forward such a motion as this, and that members should have no opportunity of bringing forward a counter-motion that he be not heard. Members bringing forward motions had to give a fortnight's notice, and the

paper announcing it did not reach members till within a week of the meeting, so that they were unable to put any counter-motion on the paper. It was very unfortunate that members should have to listen to Mr. Woodward's scolding of two men of honour. They were asked to pass a vote of censure against a distinguished member about a competition which was now ancient history, and which many of them thought had been most fortunately and most justly decided. Members, in fact, were asked to re-judge a competition that had already been decided by two eminent professional Assessors. The discussion could lead to no good, inasmuch as the matter had been settled months ago. Many of them held an exactly opposite opinion to that expressed by Mr. Woodward, and agreed that the Assessors had done a difficult piece of work extremely well. In his opinion the Liverpool Cathedral Committee were to be congratulated on having settled the competition so satisfactorily; they were to be congratulated on their success in finding a genius; and a genius who, though he was only twenty-three, was a wonderfully capable man. Especially were the Committee to be congratulated on the fact that Mr. Bodley had been persuaded to associate himself with Mr. Scott. He begged to propose, as an amendment, that the Meeting do not further discuss the matter, and that they pass a vote of congratulation to the architect and the Assessors.

The amendment proposed by the last speaker fell through for want of a seconder.

Mr. HENRY T. HARE [F.] said he happened to know something of the matter, and perhaps might state what he knew. Mr. Woodward had proposed the Resolution in extremely temperate language, and he was sorry to find himself at variance with him. In the first place, he thought it a vicious thing in principle to attempt to review the award of an Assessor at all. The Assessor examined most carefully the whole of the drawings; he had all the conditions before him, he knew all the pros and cons of each design, whereas an assembly such as the present Meeting could not know the merits or demerits of any of the designs. He had no hesitation in saying that there were not half a dozen men in that room who had examined the designs that had been published, or the conditions that were imposed upon the competitors; and there were not half a dozen members in the room who could say whether they had been complied with or not. Therefore it was ridiculous to expect them to say whether the conditions had been observed in the award or whether they had not. And when a competent Assessor had been appointed the only possible thing to do was to take his award practically without question—provided, of course, that there had been no corruption in arriving at his award. If he made an obviously wrong and improper award the only thing to do was to see that he did not occupy that position again. With regard to Mr. Woodward's contention that in this case the award was not in accordance with the conditions, the main reason for that contention was that it was asked that there should be a considerable space within sight and hearing of the pulpit. He had not examined the plans sufficiently to be able to say whether that had been complied with or not, but he knew that when the Liverpool Committee first met after the award had been made they decided to set aside the award on this ground, and when this came to the Assessors (and he had this on the very best authority) they took the trouble to set out the whole seating in the Cathedral, and they found—so he was told—that the seating space within sight and hearing of the pulpit was considerably in excess of what was asked for. Therefore it was evident that that had been considered by them. But his point was not that so much as the essential principle that it was improper for a body of men away from the designs submitted, and not cognisant of the conditions which were imposed, to attempt to review the award of an assessor.

Mr. JOHN WOOLFALL [F.] said that as President of the Liverpool Architectural Society he thought it was his privilege and his duty to come to the meeting to represent the feelings of his own Society with regard to this very important competition of which Liverpool would have the benefit. So far as the idea had been thrown out that Mr. Scott was a young man, from a Liverpool man's point of view youth had nothing whatever to do with genius; if a man was smart, it did not matter if he was only fifteen, he could get a thousand a year; if he was fifty and was not smart he could go away, and that was very well known in Liverpool. It was also very well known in art. Mr. Elmes when he designed St. George's Hall was but a novice, and yet they were still proud of him; and holding that view they were thoroughly satisfied with the award of the Assessors, and felt confident that, from the design submitted, Liverpool would possess a cathedral which would be no disgrace either to architecture or to the architect who was to erect it. He was not personally acquainted with either Mr. Bodley or Mr. Norman Shaw, but he was not there to throw mud at any man. Mr. Norman Shaw to them in the provinces was a meteor of a very high order, shining wherever he went, and they were proud to follow his work and to learn from it. Mr. Bodley he knew from his works, but not personally; and he must confess that he had himself learnt a very great deal from Mr. Bodley's powerful accuracy and beauty of detail. He (Mr. Woolfall) knew the intricate work of the Cathedral Competition, and the difficulties that the Committee had had to contend with from the very beginning of the competition when their worthy ex-President, Sir William Emerson, got so honourably first, and they would have been very glad to see that design of his carried out. But that Committee was gone; the people who would have given the money were dead; the whole thing had changed, and the thing stood on another basis. His own opinion was, and he thought it was the opinion of Liverpool—he spoke certainly for his own Society—that Liverpool was very proud of what had been done about the competition. Speaking apart from this competition, and of assessorships generally, he knew the difficulties of the post. An assessor ought always to judge a competition, not on the merits of a design, but on the conditions laid down; and if the design did not comply with those conditions it was the duty of the assessor to say, "Although this is the better design of the two, it does not comply with the conditions, and therefore from a legal point of view it is not within the competition." But in a matter like the present, which was a very difficult matter in every way—hedged about with difficulties he believed which none of them could thoroughly grasp—the Assessors who had had those difficulties to face believed that the design would be a credit to the country and to art after the present time had gone by; and they stuck to their award, and pressed it on the Committee; and the Committee, because they had Liverpool with them, agreed to accept it, and were going to carry it through.

Mr. THOS. E. COLLETT [F.] pointed out that the words of the Instructions were that the competitor would be "liable" to be thrown out, not that he should be thrown out, if he did not observe certain instructions. He thought that should be taken into consideration.

THE PRESIDENT said that as Mr. Gilbert Scott was not a member of the Institute he (the President) had considered that it was only fair to write and call his attention to the Resolutions to be brought before the Meeting. He had had a letter from Mr. Scott in reply, in which he said: "With regard to the matter of condemning the Assessors for selecting a design which did not comply with the Conditions, I think, though the matter does not concern me, that the Conditions should be carefully studied. I have them before me as I write, and nowhere is it given as a condition that the central space should be large and capable of seating

3,000 persons. It is merely a suggestion of the Committee, and it is expressly stated that it is not expected that competitors will be able to comply literally with the whole of the Instructions contained in this list of accommodation, but they should be looked upon as suggestions to be adopted as far as possible." The letter went on to say: "And latitude is given to the competitors, to elicit the best possible scheme for the buildings generally. The Committee suggested that the central space at the crossing of the nave and transepts should be large and fully capable of seating 3,000 persons" &c.

Mr. MAURICE B. ADAMS [F.] said he could not help thinking that this discussion was somewhat unfortunate. He could not see what practical good would arise from passing this Resolution. At the same time he thought they were indebted to Mr. Woodward for the extremely moderate and businesslike way in which he had placed the subject before them. There was no one in that room who would not most willingly accord every consideration to both Mr. Bodley and Mr. Norman Shaw. Personally, he had unlimited admiration for them in their work, and from what he knew of them personally, and therefore he felt very sorry that the Institute had been called upon to discuss this; and yet he could not help feeling that there was a great deal of force in what had been said. He realised that assessors did not observe, as they fairly should do, the absolute defined conditions which were submitted for men to work to. It was all very well for Mr. Hare to tell them that when an assessor made an award they were bound in honour to accept it. But a competition was a plain, matter-of-fact piece of business between the promoters of the building and the persons who were engaged in the competition, and first and foremost he maintained that the conditions were absolutely the determining factors by which the award should be made, and if, as Mr. Collett had pointed out, they were mere suggestions, then they should be treated as such; but if there were defined and absolutely unequivocal instructions that such-and-such accommodation should be provided, any design, no matter what its excellence artistically, no matter how ingenious and adroit its planning might be, ought to be thrown out if it did not comply with those conditions. He had lately taken part in a competition where certain definite things were asked for, and they were told that they must not deviate in any material point from the instructions laid down. The assessor appointed by the Institute had accepted a design which left out fundamental things which were absolutely asked for. That was unfair; and if this discussion could only emphasise the obligations of assessors to conform to the regulations laid down for individual competitions, this discussion would not have been in vain. Loyalty was a thing which every Englishman valued above everything, and if members of the Institute were not loyal to the Council, and loyal to the Chair, chaos must rule. In anything he might say he was second to none in his loyalty to the authorities. But he did think there should be more care than there had been. He had visited a great many competitions in the course of his experience, and he had found not unfrequently by measuring up the drawings that the figured dimensions on the plans did not tally with the size of the site.

Mr. S. BRIDGMAN RUSSELL [F.] asked leave to put three questions. First, why did the Committee not accept Mr. Scott's design in the first instance when the Assessors awarded him the first prize? It was, he thought, because he did not comply with the condition as to a larger central area. How did Mr. Bodley come in? By great pressure, we are told.

THE PRESIDENT: That is the second Resolution.

Mr. RUSSELL, continuing, said that the first point was that the Committee did not accept Mr. Scott's design because it did not comply with the conditions as to a large central area, and they called in Mr. Bodley to assist

Mr. Scott to devise a plan so as to comply with the conditions.

Mr. A. SAXON SNELL [F.]: Was this question of the accommodation a suggestion or a condition?

Mr. WOODWARD read clause 7 of the Conditions, which were headed "Instructions and Conditions to be Observed by competing Architects, with Plans of Site" &c. The clause ran: "For the information of competitors the following buildings are suggested. It is not expected that competitors will be able to comply literally with the whole of the instructions contained in this list of accommodation, but they should be looked upon as suggestions to be adopted as far as possible, and latitude is given to the competitors in order to elicit the best possible scheme for the buildings generally, the Cathedral consisting of nave, with all necessary aisles, porches, &c. The Committee suggest that the central space at the crossing of the nave, transepts, and choir should be large and fully capable of seating 3,000 persons (without any interruption of the view from columns), either in the form or plan of an octagon, circle, or other design, as thought best by the architect, due consideration being given to the acoustic properties of the building."

THE PRESIDENT: That is exactly what Mr. Scott said.

Mr. JOHN SLATER, Vice-President, said he thought the discussion on this first Resolution had gone as far as need be. The words read out by Mr. Woodward distinctly showed that these conditions were put forward as suggestions. What Mr. Gilbert Scott said in his letter was what any competitor might have judged from the Conditions. It was not laid down as a *sine qua non* that the suggestion as to space about the central portion should be absolutely observed, but that the competitors were to have a certain amount of liberty in construing these conditions. It seemed to him that Mr. Woodward could not press this first Resolution, because if they were to pass it they would be absolutely stultifying themselves. *The Times* reported that at a meeting of the Committee on the 16th May it was decided that this design should not be adopted because it did not fulfil those conditions. But within a week apparently they found out their mistake. That was all they could say, and that being so *cadit questio*—the matter fell to the ground.

Mr. T. H. WATSON [F.] called attention to the words "designs will be liable to be excluded if the competitor" &c., and then another Clause said, "if in the opinion of the Committee the conditions or instructions are violated," but the word "suggestions" did not occur.

Mr. E. W. HUNSON [A.] suggested that a middle course perhaps would be the wisest. It would be a pity that any body which had not the power of enforcing a verdict either for or against should proceed to give that verdict. Without suggesting any amendment, he would ask Mr. Woodward to consider whether his Resolution could not be put in such a form as to show the feeling of the Institute without conveying any personal censure.

Mr. EDWIN T. HALL [F.] said he joined with Mr. Hare in expressing his appreciation of the very calm and appropriate way in which Mr. Woodward had brought forward his Resolution. He spoke with great moderation all through. He was sure, however, that Mr. Woodward desired most earnestly to be strictly accurate, and that being so, when he put before the Meeting the Resolution, "That this Meeting condemns the action of the Assessors in giving the first place in the final competition to a set of drawings which did not comply with the essential condition of the competition," he had in his (Mr. Hall's) opinion failed to show them that the selected competitor did not comply with the essential condition of the competition. As he understood Mr. Woodward, that essential condition was that there should be a space for 3,000 people to hear and see the preacher, but it had since

transpired that that was not an essential condition of the competition; on the contrary that it was not a condition as such at all. The conditions of the competition were other things; but clause 7 was a suggestion. No one was stronger than he was in the view that an assessor should reject the best design in the world if it were contrary to the express conditions of the competition. But when suggestions were made, they were made in order to give a lead. The Committee said inferentially: "We are laymen; we should like such-and-such done; but if you as a competent architect say that other circumstances override those that we should like in order to get that noble building which we desire, you are to use your own discretion." Thus, *ipso facto*, they left it to any competitor to reject that suggestion if he thought right. Mr. Scott appeared to have done it in this case. The Committee appeared, according to *The Times* report, to have been under a misapprehension. They thought that they had laid it down as a condition. So far from condemning the Assessors in respect of this Resolution they might reasonably think that as honourable gentlemen the Assessors went to this Committee and said, "Gentlemen, you have made a mistake; you have been condemning a man for a breach of that which was not a condition. You are under the impression it was. You have given deliberately in print to this man the power to reject your suggestions if he thinks fit, and you cannot hold him responsible if, in the exercise of his judgment, he rejects them." If that were so, the Assessors had honourably protected, not Mr. Scott alone, but every competitor. Were they to suppose that there was nobody else in the competition who might have read that clause 7 in its plain English, and who might in some other respects have varied from it, because in his judgment he could get a design more worthy of the city, and more worthy of the competition, by rejecting a suggestion while keeping strictly within the conditions? Therefore he ventured to suggest, and he thought Mr. Woodward would as a fair-minded man say, that when the circumstances of that clause 7 were thoroughly present to his mind, having regard to the extra light that had been thrown upon it by this discussion, he felt it would be the right course to withdraw the Resolution.

Mr. C. E. HUTCHINSON [A.], referring to the remark that the seating capacity mentioned was merely a suggestion, said it seemed strange to his mind that the Committee should mention the specific number of 3,000 people as a pure suggestion, as it was strange again that, so far as he had seen of the designs, the whole of the competitors absolutely struggled for it, and appreciated that it was an essential of the scheme. Now it was said: "You can simply disregard the requirement, and only provide for 1,500 and still win the job." Figures are figures. It had been said that it was an unfortunate thing that this meeting had to be called; he agreed with that. It was an unfortunate thing that they should have to come there and discuss the action of assessors. Personally he thought it would be much more in keeping with the dignity of the Institute if they left that to the Council; but in this particular case the Council did not take the action which was in accordance with the views of most of the members of the Institute, and therefore the matter had had to be brought up by an ordinary member. He ventured to think that every member of the Council should be alive to the fact that he is representing the whole body; that he must put aside his personal friendships, must act boldly, and take matters as they came before him; he should remember that he was representing those 200 to 300 members who had elected him to a place on the Council. Mr. Hare told them that he deprecated the attempt of members to deal with the award of an assessor, and almost immediately afterwards told them that if an award were obviously wrong the Assessor should not be

appointed again. But it had happened frequently that an award was obviously wrong, and he deeply regretted to say that the Council had taken no action at all; it was the competitors who had had to come to the rescue. Over this particular competition there had been a great deal of dissatisfaction expressed in the architectural Press, and it was not an isolated case. A man who is generally dubbed "The Disappointed Competitor" writes and says: "The design that has been awarded first place is not in accordance with the conditions." But they very seldom hear of cases where such a matter has been taken up, as it should be regularly. If conditions are laid down and those conditions are of any good, competitors and assessors should abide by them; and if they do not abide by those conditions, and particularly in instances where the Institute had appointed the Assessor, then it was the duty of the Institute to inquire into the matter.

Mr. H. J. LANCHESTER (F.) said he thoroughly agreed with those speakers who had argued so ably that this was only a suggestion and not a condition. It was not befitting the dignity of a body such as the Institute to condemn or to make any sort of question of a matter that was merely a suggestion. He was astonished that such a small question should have come before them.

THE PRESIDENT said he believed the Council's view was that when they had two such experienced Assessors, men for whom they could not help having the greatest admiration, it was certainly not for them to go behind their award and to judge the matter over again. It must be remembered that the only way they could attempt to question the Assessors' award was by having all the drawings before them, and the Conditions, and they must go through the whole thing from beginning to end before they could question the decision, not only of two such distinguished men as those in question, but of any man who was placed in the responsible and difficult position of an Assessor. He could not believe that there was anyone present who would venture to condemn this award who had not had the whole of the drawings before him, with the Conditions, and spending an equal time in finding out which was the best design and which best met the conditions and suggestions laid down. He agreed entirely with what had been said with regard to the moderate and fair way in which Mr. Woodward had brought forward his motion—nothing could have been better—but he hoped they would not countenance the idea of setting themselves up in a matter like this to be judges—for that was what they were attempting to do—to be judge in a thing where they had not had an opportunity of arriving at a fair and proper judgment. He had a letter from Mr. J. W. Simpson, who took a great interest in competitions and had often been a competitor himself. He was unfortunately ill, or he would have been present; but he wrote: "My own view, if I may venture to put it before you, is that the first Resolution should be firmly opposed. If men enter for competitions with incompetent assessors, they must take the result in a sporting way, and not try to weaken the public value of all assessors' awards by questioning those they do not agree to." They had been for years saying to the public, "Have a professional assessor, and we will enter for these competitions. If you will not have a professional assessor, but assess them yourselves, we shall stand aside and we shall not enter into any of your competitions." But if now the public are asking to do what we have asked them, and very generally appoint a professional assessor, we say, "You have appointed two of the most distinguished assessors," and then you come here in general meeting and say, "You have made a wrong award, and we are going to throw it all over." What will be the result? He hoped that members of the Institute would show more sense of the gravity of the position than to act in that way. He would put it also on another ground—that it was not a

very sportsmanlike thing to do. Suppose they played cricket and were out leg before—he believed no one who played cricket ever thought he was out leg before—but if the umpire said "Out," of course, as a sportsman, out he goes—he walks back to the pavilion and lays down his bat and says not a word. He might object to that umpire next time, but he would never dream of saying, "Oh no, I was not out; I am going to play again." Mr. Woodward even suggested a third competition. Many of them thought there should not have been a second competition. He agreed with Mr. Woolfall—many would have preferred to see the first competition design carried out. As their Chairman, he had endeavoured to put before them the very serious and great responsibility that rested on them, and as their President he ventured to think that they would find themselves in a very improper position if they were deliberately to vote contrary to the award of the two assessors who had acted in this case.

Mr. WOODWARD said he should like to say a few words with regard to some of the observations that had been made. But first he would read a letter which had just been placed in his hands from Mr. Sidney R. J. Smith. He wrote: "Dear Mr. Woodward, I am so sorry I cannot get to the Institute to-night. I quite agree with the action I hear you are taking with regard to the Liverpool Cathedral Competition. You have my sympathies, and would have my vote. I deeply regret I cannot come and support you." A great deal had been said with regard to this question as to whether it was a suggestion or whether it was a condition. As regards that point he knew that some of the competitors had made provision for the seating within sight of the preacher of 3,000 persons. There was no doubt whatever in the minds of those competitors that that was the wish of the Committee. Let them hear what the Committee said. Mr. Hall was very eloquent and imagined what the Committee might have said. But there was something in *The Times* which the Committee did say, and he would read it: "It is recalled," they say, "that in drawing up the Conditions of the competition the Committee made a strong point." There it was. They could call it what they liked; they could call it a suggestion, or they could call it a condition or a recommendation, but there the Committee stated that they made a strong point of the seating capacity for 3,000 persons; and many of the competitors made a strong point of it and designed their plan accordingly. An appeal had been made to him to withdraw his Resolution. He had no intention of doing so. He had thought a great deal on the subject. He had been to Liverpool and spent hours with the first set of drawings and also with the second set. He knew the conditions of the competition, and had carefully studied all the drawings sent in in accordance with those conditions; and that made him stronger on this point; that it must have been within the cognizance of the Assessors that this essential condition (one of their strong points, as the Committee said) was ignored by the selected design. He had no desire to invite another competition; he was quite satisfied to let this competition be where it was. There never was any intention in his mind to call in question the result which had been obtained after so much trouble and expense. All he desired to do was to emphasize the fact that the present Meeting viewed with considerable disapprobation any competition, and particularly the one in question, where an essential condition or strong point had been ignored by the successful competitor. He therefore moved his Resolution.

Mr. LEONARD STOKES (F.) moved as an amendment that the Meeting pass to the next Resolution.

Mr. HARR seconded this amendment, and in doing so said that they had at present only Mr. Woodward's statement, backed up by the first Report of the Committee, that a condition or suggestion was not complied with.

But what actually happened after that first Meeting of the Committee was this: the Assessors were communicated with, and were told that the Committee had arrived at its decision, and then they communicated with the Committee again and pointed out that the Committee was wrong in supposing that the accommodation had not been provided.

Mr. WOODWARD: By what authority do you make that statement?

Mr. HARE: One of the Assessors. The Assessors communicated with the Committee, and pointed out that they were wrong in supposing that the condition as to the accommodation had not been complied with; and with that and other representations they succeeded in inducing the Committee to go back upon their Resolution.

Mr. GEORGE LUCAS [A.] said that a great point had been made about the accommodation of 3,000 people. But one of the conditions mentioned in the Committee's recommendations was that there should be a crossing, with a dome or octagon, or something of that sort. But if Mr. Scott's design was to be rejected, another design ought to have been rejected which absolutely ignored any scheme of crossing. But no point had been raised that it was unfair to admit that design to the competition, so they must allow that the Assessors exercised considerable influence in allowing that design to stand. He asked permission to move as an amendment: "That, in view of the general misunderstanding which has arisen over the Liverpool Cathedral Competition, this Meeting desires to impress upon Assessors that they should see that the conditions are more strictly worded as regards suggestions and absolute conditions for competitions."

Mr. E. W. HUDSON [A.]: I will second that.

Mr. H. K. BROMHEAD [F.] said he thought there had been a good deal of mistake made in the discussion that evening. It seemed difficult for architects to understand that in a competition some conditions were conditions, and other points were suggestions that competitors were not bound to follow. When acting as Assessor himself he always put in a condition that if any drawing &c. was not in accordance with the conditions it should be immediately disqualified; but then he always made the conditions, and if he accepted a design as having complied with those conditions, he thought no one else had a right to say that the conditions were not followed. If he suggested that there should be 3,000 people, that was only a suggestion, and if a competitor provided for 3,000 people he was quite right in doing so. Again, if another competitor provided for only 2,000, he was quite right in doing so—it was merely a suggestion. But if it was said, "There is the condition, and it must be upheld," that was a condition absolutely. It was clear that Mr. Woodward and others who had spoken had distinctly the impression that this suggestion was an express condition that had to be complied with. As regards the point that the Committee themselves said that they made a great point about this particular matter, supposing the Committee did after a suggestion had been put in say, "We did make a suggestion, and we have made a great point of asking our assessor to make that suggestion, but now we see better, and we know better," they were at liberty to do so. Conditions were therefore conditions, and suggestions were suggestions.

Mr. LEONARD STOKES's amendment, "That the Meeting pass to the second Resolution," was then put to the Meeting and carried by 36 votes to 14.

Mr. WOODWARD then moved the second Resolution—viz.: "That this Meeting views with the greatest disapproval the action of one of the Assessors in allowing himself to be associated with the selected competitor in the carrying out of the work." This Resolution, he went on to say, required under the circumstances very little to be said—it carried with it

its own conviction. They had heard one or two statements made, and the President had referred to it in his Presidential Address, that Mr. Bodley did not consent to occupy that position until he had been very much pressed to do so, and that if he had declined, the competition would, for all practical purposes, have been a failure; but whether a man was eminent or whether he was not, he had only one undeviating duty before him as an umpire in such a case as this—viz. to reject all invitations to take part in carrying out a competition of which he had been an assessor. It must be an unfortunate precedent if an assessor was to become associated as architect with the building because, as in this case, perhaps, of the youth of the selected man. Assume that an assessor was not a man of the high honour which attached to Mr. Bodley. It was obvious, if a young man were selected, that he, the Assessor, in reporting to the Committee, might say this—it was quite an imaginary case, but it was one he could quite contemplate: "Well, gentlemen, the best set of drawings before us is the set of drawings of Mr. Jones; but Mr. Jones, unfortunately, is a very young man, and this is a very important building, and you know, although the drawings are very beautiful, I hardly think he is a man you would intrust with the carrying out of this large work." Thus he said almost inferentially: "I, your assessor, am a very experienced man. Now, then, gentlemen, here is the suggestion: just imagine intrusting a large building like this to this young man. Give him 500 guineas—he will be delighted with it—and let your humble servant carry it out." That was what might occur. He could only say in one sentence that he strongly deprecated the action of any assessor in this or any competition in associating himself in any way whatever with the selected competitor; and it was on that ground that he begged leave to move the Resolution.

Mr. A. W. S. CROSS [F.] in seconding the Resolution submitted that it was no palliation of their fellow member's offence against the recognised professional etiquette to plead that the gentleman in question was indispensable to the Institute, because no man was indispensable to any old established Institute such as theirs. In order to induce architects to enter their fold they had before today abrogated one of their greatest safeguards; and if they condoned this offence, another safeguard would go by the board; for though the President in his Opening Address said that this case was not to be regarded as a precedent, yet he (Mr. Cross) submitted that, *ipso facto*, it was a precedent; and if they condoned this offence they should be unable, consistently with the exercise of justice, to take action against any other member for a similar offence. He remembered a somewhat similar instance on the occasion of a competition for a small Town Hall. Then, as now, the Assessor, a member of the Institute, was allowed to be associated as joint architect with a young man whose design had been selected, under the special circumstances of the case. He remembered another case in which the promoters of a certain competition approached the Council of the Institute with a view of ascertaining whether "under the special circumstances of their case" their Assessor—who, by the way, had not been appointed by the then President—would be allowed to carry out the work as joint architect with the successful man; but, unfortunately for him, that assessor was neither an eminent architect nor a member of the Council, and the promoters' suggestion was therefore promptly vetoed by that body, and this despite the fact that the circumstances connected with that case were of an extraordinary and special character. The Council had issued no official protest against the conduct of its fellow members, and by its condonation of such offences when the offenders were members of its own body, and by its prompt deprecation of the suggestion that the Assessor

should act as architect when that suggestion was made in the interest of an outside man, gave just occasion to imputations of cliques and favouritism. In cases in which competitions were won by young and inexperienced men, were there no architects other than those who had made the awards who were capable of rendering the necessary assistance to the successful man? There was no doubt that the Assessor's proceedings were contrary to the regulation contained in clause 3 of the Institute's Suggestions for the Conduct of Architectural Competitions; and therefore Mr. Woodward and those who had interested themselves in this question appealed with confidence for the support of members present in favour of this Resolution, which was founded upon a sound basis of justice and equity. If they were discussing the conduct of young and obscure men their action would certainly have been prompt and decisive. Because the offender was an eminent architect, they were expected to condone his conduct; and he protested in the name of common sense and common honesty against such a policy as simply degrading their great profession and as being seriously detrimental to the interests of the Institute.

Mr. H. J. LANCHESTER [F.] said there seemed to be rather a ferocious attack made on one of the members of the Institute, and as he had been on the Town Council of Hove for a good many years he should like to say a few words from that point of view. When the Liverpool Committee considered this matter there was a Protestant majority against Mr. Scott, and the minority then put their heads together and considered what would be the best means of getting their own way. Of course the minority were very intelligent men, and they happened to choose Mr. Bodley to associate with Mr. Scott. Mr. Bodley was no longer an assessor; his duties as assessor were at an end; and it must be remembered that the only suitable man the minority knew was Mr. Bodley, and, therefore, the minority were very glad to back up their case by the help of Mr. Bodley. Mr. Bodley was reluctant to take the post, but to secure the appointment of Mr. Scott he very kindly consented to take it. He had known a somewhat similar case on his own Board, of which he had been a member for twelve years.

Mr. MAURICE B. ADAMS [F.] said that it would be a great pity if the Meeting were to pass this Resolution. Personally he thought that Mr. Bodley had done the best thing he could under the circumstances. As to Mr. Bodley doing a thing which was in any way questionable as an honourable man, it was quite impossible; and he (the speaker) was one of the first to point out in the Press the invidious position in which Mr. Bodley was placed; but he was perfectly certain that he did not accept that position until he found there was no alternative. But to say that Mr. Bodley did it for any personal advantage was unworthy of them, and he could not admit it for a moment. He should therefore oppose Mr. Woodward. But he could not blame him for bringing up this question, although surely the remark made in the Presidential Address might have been sufficient. He himself was very glad to hear it, and he thought it was stated with great moderation and dignity, and he should have been content for the matter to have remained there. But inasmuch as it had been raised, and they had had this discussion, let it rest there; no doubt Mr. Bodley would hear that they had had this discussion, which would anyway have this advantage, that it would emphasise the importance of assessors being extremely careful how they adjudicated on other men's designs.

Mr. FRAMPTON [A.] said that as one who condemned the appointment of assessors entirely, and advocated the appointment of juries to decide matters relating to competitions, he differed, no doubt, from a great many present that evening. He was trained in Paris, and whilst there he noticed how well all their competitions were decided.

It was very rare for one to hear in Paris any adverse criticisms in reference to them. But every time there was a competition in this country, there was always some question arising out of it; and the reason was because of their having such abominations as assessors. He considered that the sooner these were done away with the better it would be for this profession, so far as it related to competitions. With regard to the case in point, the Assessor was completely *hors de combat*; he had no right whatever to take any part after he had given his decision.

Mr. EDWIN T. HALL [F.] said that the fundamental principle which was called in question had, he thought, not been considered. The Institute had clearly laid down in its Suggestions as to Competitions its views in regard to assessors. It was laid down in those Suggestions that it was not right for an assessor to take part in the carrying out of work in which he was engaged. With that they all agreed. But here was an exceptional circumstance. Assume that the youngest member of the Institute is in for a large competition, and by his genius and ability wins it. Somebody steps forward and says, "It is perfectly ridiculous giving this man the fruit of his labour—he is too young." Mr. Bodley, a man about whose honour there could be no two opinions, had stepped forward and said, "Gentlemen, you ought to give this work to this young man." They say, "No, we will not for various reasons"—and we know as a fact that he was going to be rejected because he was too young. Then they said to Mr. Bodley, "If you will associate yourself with him we will let him have it; if not, we will not."

Mr. WOODWARD: I must rise to order, Sir. I should like Mr. Hall to give us his authority.

Mr. HALL: I think, Sir, I may be at liberty to mention my authority. My authority is Mr. Bodley. Mr. Bodley was pressed to do this, and Mr. Bodley refused it because he thought that no assessor should do it. Then they said, "Mr. Scott cannot then have this building," and to save Mr. Scott, and to help a young man (and any one of you might have been that young man), Mr. Bodley steps into the breach and says, "To secure this young man the fruits of his labour I will assist him." Mr. Bodley, continued Mr. Hall, deserved the thanks of every young man in the Institute infinitely more than any of the seniors because he stepped into the breach and secured that this young man should have the fruit of his labour and genius. And that they should be asked to reproach him for it was simply incredible. They would lose their dignity, and would commit a grave offence against the honour and integrity of architects in England, if it ever went forth that the Institute had condemned an honourable man for taking the quixotic, perhaps, but at the same time noble course of going to the help of this young man to get the reward of his labour.

Mr. H. H. LANGSTON [A.] said it would have been better if Mr. Bodley had written a letter to the Institute stating what Mr. Hall had just explained.

Mr. WOODWARD asked permission to rise at once and withdraw his Resolution. But he requested the attention of the Meeting to his reason for doing so. He understood from Mr. Hall that Mr. Bodley had declared that the Committee said in effect these words, "If you, Mr. Bodley, will not act with Mr. Scott, Mr. Scott shall not have the work of this cathedral." If that was the assertion made by Mr. Bodley, and if Mr. Hall declared that Mr. Bodley made that assertion, he at once withdrew the Resolution. But he must ask that this should be substantiated, and if the suggestion made by Mr. Langston be adopted, and a letter was written to the Institute by Mr. Bodley to that effect, he was sure every member of the Institute would be very glad to hear it.

Mr. WOOLFALL said he was sorry Liverpool had been the cause of all this trouble, but he thought they should get over it now. He was very pleased to hear what Mr. Hall

had said. He (Mr. Woolfall) was somewhat behind the scenes, and he could corroborate what Mr. Hall had said with regard to Mr. Bodley coming into the breach and helping to save the young man the fruit of his labour. At the same time he felt very strongly—and he had made it a subject of his Presidential Address—that assessors should not, under any circumstances, take part in carrying out a work in regard to which they had been assessors. But after all was said, there were so many complications connected with the Cathedral Competition that it could hardly be judged as an ordinary competition. The members of the Committee were all honourable men; they were all picked men of Liverpool. They were the friends of Liverpool, and he was proud to say that they had convinced Liverpool that they were trying to do their best honourably, and he did not think they would go behind anybody's back, Mr. Bodley's, or Mr. Scott's, or anybody else's. When they realised that Mr. Scott was a Roman Catholic, of course there was a little feeling of diffidence about it; but that was got over in an honourable way—it only wanted explanation. Then his youth came out, and then the business instinct of Liverpool came up. "He is a good man, but has he experience? Is he capable of constructing this building which he has been so competent to design? He has put it on paper: can he build it?" That was the point they put to Mr. Bodley naturally, and could he say that he was? He hardly thought he could. Then they had plenty of men in Liverpool; they were not ashamed to say that Messrs. Paley and Austin were good men, and capable of holding their own with anyone. Why did the Committee not claim them and put them second? No, the Committee, he believed—he had not the high authority that Mr. Hall had, that of Mr. Bodley himself, but he had it from members of the Committee that they made it a *sine qua non* that Mr. Bodley should act so that this young man should keep the laurels he had so ably won. He was sorry that this should have been brought up. He agreed with the President that this should not be a precedent. He thought the Institute ought to make a special point of considering the position of assessors with regard to their taking up the work of those people who have been engaged in the competition.

Mr. MAURICE ADAMS observed that Mr. Bodley published in the *Building News* a letter entirely in accordance with what Mr. Hall said.

Mr. C. E. HUTCHINSON said he would move an amendment as follows: "That this Meeting views with the greatest disfavour the action of assessors in allowing themselves to be associated with the selected competitor in the carrying out of the work."

Mr. LANGSTON seconded.

Mr. SLATER said the amendment was perfectly useless—it was simply a restatement of what they had themselves laid down over and over again.

The President said that, with regard to his own opinions on this particular matter, they were stated carefully and thoughtfully in his Address, and he had nothing to add or to alter. But when this important matter came on, he had written to Mr. Gilbert Scott on this point, as well as on the other. Mr. Scott replied: "The appointment of Mr. Bodley as joint architect of the Liverpool Cathedral was made with my full consent and approval, and Mr. Bodley only consented to accept the appointment when he knew that I heartily agreed to the proposition. Although the nomination of an assessor as joint architect is a bad principle, this is an exceptional case, and I consider that no blame whatever should be attached to Mr. Bodley." That was what Mr. Gilbert Scott himself said, and carried out very much what they had heard from other speakers, that this appointment of Mr. Bodley with Mr. Scott was a helpful thing for him. As a rule assessors should not be concerned in the carrying out of the build-

ing they have selected; the Institute Suggestions especially mention that; but in this case he believed it to be a fact that had Mr. Bodley not been brought in, the competition would have fallen through, and Mr. Scott would have lost the fruit of the noble design he produced on that occasion.

Mr. BROMHEAD suggested that they had had a very interesting conversation, and most of them were quite content to leave it there.

Mr. SYDNEY VACHER, referring to Mr. Hutchinson's amendment, said it would be an extremely foolish thing if it were carried. The Meeting had no right to tell its members that under no circumstances should an assessor associate himself as consulting architect with the gentleman who had gained the award. The Assessor had finished his work as such, and any subsequent arrangement was a matter between the promoters and himself.

Mr. LANGSTON submitted that as a matter of policy it might be well for such a Meeting as this to lay down that they viewed with disfavour assessors allowing themselves to be associated with the successful architect in carrying out the work.

The President pointed out that there was a technical difficulty about Mr. Hutchinson's amendment. The Resolution was withdrawn; therefore the amendment became a new Resolution, and it would be necessary to give notice of it.

Mr. HUTCHINSON: I understood Mr. Woodward to say that he had not withdrawn his Resolution.

Mr. WOODWARD said he withdrew his Resolution with great pleasure on the distinct statement Mr. Hall had made to them. The whole thing turned upon that. He did not wish that it should be said that he brought forward a Resolution here and withdrew it, unless there appeared to be a definite and just reason why he should withdraw it. It had been represented to them that evening that the Committee said, "If you Mr. Bodley will not act with Mr. Scott, Mr. Scott shall not have the work."

Mr. HARE: That is right.

Mr. WOODWARD: If that was the case he willingly withdrew the Resolution. They would all be very sorry to pass a Resolution of that sort when they knew that it was the kindness of the action of Mr. Bodley which had prevented Mr. Scott from being ousted from the merit of his work. That put an entirely different complexion upon it, and therefore with that proviso he would withdraw his Resolution.

Frasersburgh.—Infectious Diseases Hospital and Public Library Competition.

As the conditions for this competition are thoroughly unsatisfactory, and as the Town Council have stated, in answer to representations from the Institute, that they do not see their way to alter the conditions, it is to be hoped that no member of the Institute will compete.

Monsieur Homolle at Cambridge.

At Cambridge on Saturday, the 5th inst., the University conferred upon M. Homolle the honorary degree of Doctor of Letters. On the previous day the distinguished savant addressed the University on the subject of his explorations at Delphi.

Smoke Abatement.

The Westminster Council have asked the Court of Common Council to support the following resolution:—"That in view of the damage to health

and property caused by coal smoke the London County Council be urged to undertake an inquiry into all the methods of cooking, so as to ascertain whether there is any form of apparatus which is smokeless, and at the same time practical and economical for general use."

MINUTES. III.

At the Third General Meeting (Business) of the Session 1903-04, held Monday, 30th November 1903, at 8 P.M.—Present: Mr. Aston Webb, R.A., *President*, in the Chair, 30 Fellows (including 10 members of the Council), and 50 Associates (including 2 members of the Council): the Minutes of the meeting held 16th November [p. 47] were taken as read and signed as correct.

The following Associate attending for the first time since his election was formally admitted by the President—viz. Walter Watkin Ellison.

The Hon. Secretary announced the decease of Edward James Martin, of Calcutta, elected Associate 1874, Fellow 1883.

The Hon. Secretary announced the receipt of donations to the Library, and a vote of thanks was passed to the donors.

The following candidates for membership were elected by show of hands under By-law 9:—

As FELLOWS (5).

LLEWELLYN KITCHEN [A.] (Hull).
BROOK TAYLOR KITCHIN.
SYDNEY PERES, F.A.S.I. [A.].
BASIL ALFRED SLADE.
MELVILLE SETH WARD.

As ASSOCIATES (22).

EDWARD PERCY ARCHER [Probationer 1897, Student 1901, Qualified 1903].
ORMROD MAXWELL AYRTON [Special Examination 1903].
HENRY ARTHUR BATTLE [Probationer 1894, Student 1895, Qualified 1903].
THOMAS JAMES BEE [Probationer 1894, Student 1898, Qualified 1903].
HARRY THOMAS BILL [Probationer 1898, Student 1899, Qualified 1903] (Birmingham).
HERBERT BLACK [Probationer 1900, Student 1901, Qualified 1903] (Cape Town, S. Africa).
GUY CHURCH [Probationer 1898, Student 1900, Qualified 1903].
JOHN DANIEL CLARKE [Probationer 1897, Student 1902, Qualified 1903].
WILLIAM EDWARD COUCH [Probationer 1897, Student 1899, Qualified 1903].
PERCY BOOTHROYD DANNATT [Probationer 1897, Student 1901, Qualified 1903].
HENRY EDMUND DAVEY [Probationer 1892, Student 1894, Qualified 1903].
ROBERT ROBB GALL [Probationer 1898, Student 1899, Qualified 1903] (Aberdeen).
JORDAN GREEN [Probationer 1900, Student 1901, Qualified 1903] (Birmingham).
THOMAS FRANK GREEN [Probationer 1893, Student 1898, Qualified 1903].
ERNEST MARTIN JOSEPH [Probationer 1899, Student 1899, Qualified 1903].

ALBERT EDWARD LACEY [Probationer 1895, Student 1898, Qualified 1903].
THOMAS EDGAR RICHARDS [Probationer 1900, Student 1902, Qualified 1903] (Barry, S. Wales).
TOM SIMPSON [Special Examination 1903].
HAROLD BAYLDON SMITH [Probationer 1896, Student 1902, Qualified 1903] (Port Elizabeth, S. Africa).
GEORGE WALKER [Probationer 1897, Student 1898, Qualified 1903].
SEPTIMUS WARWICK [Probationer 1897, Student 1902, Qualified 1903].
RICHARD WYLIE [Probationer 1900, Student 1901, Qualified 1903] (Gateshead).

As HONORARY ASSOCIATES (2).

LORD BALCARRES, M.P., F.S.A., Junior Lord of the Treasury.
THE RIGHT HON. LORD WINDSOR, P.C., D.L., First Commissioner of His Majesty's Works.

As HON. CORRESPONDING MEMBER.

CHARLES FOLLEN McKIM, President of the American Institute of Architects, Royal Gold Medallist 1903 (New York, U.S.A.).

The Secretary announced the results of the Preliminary, Intermediate, and Final Examinations held in November [p. 69].

The Secretary announced that by a resolution of the Council under By-law 20 the following gentlemen had ceased to be members of the Royal Institute—viz. Henry Carrie Creighton, Thomas Bradford Ellison, John Frederick Fogerty, and Thomas Price Roberts.

Mr. William Woodward [A.], in accordance with notice, directed attention to the proceedings of the two Assessors in the recent Liverpool Cathedral Competition, and moved the following Resolutions, which were seconded by Mr. A. W. S. Cross [F.]:

1. That this Meeting condemns the action of the Assessors in giving the first place in the final competition to a set of drawings which did not comply with the essential condition of the Competition.
2. That this Meeting views with the greatest disapproval the action of one of the Assessors in allowing himself to be associated with the selected competitor in the carrying out of the work.

An amendment, moved by Mr. Sydney Vacher [A.], that Mr. Woodward be not heard, failed for want of a seconder.

The first Resolution having been discussed, an amendment proposed by Mr. Leonard Stokes [F.] and seconded by Mr. Henry T. Hare [F.], that the Meeting pass to the next Resolution, was carried by 36 votes to 14.

The second Resolution was then discussed, and explanations of the Assessor's action having been given, Mr. Woodward withdrew his Resolution on the ground of a statement made by Mr. Edwin T. Hall [F.].

The proceedings then terminated, and the Meeting separated at 10.30 P.M.

ALLIED SOCIETIES.

The Leeds and Yorkshire Society.

At the annual meeting of the Leeds and Yorkshire Architectural Society, Mr. Butler Wilson, the president, in the chair, Mr. H. S. Chorley (hon. secretary) presented the 28th report, which is an account of the proceedings of the Society for the past eighteen months. The aggregate membership, it stated, is 141, namely, 31 Honorary Members, 66 Members, and 44 Associates, as against a membership of 137 at the date of the last report. The Council express regret that Mr. C. R. Chorley, one of the oldest members of the Society, and a past president, has resigned his membership on account of his leaving Yorkshire on his retirement from business. Regret is also expressed at the resignation of Mr. J. Tweedale, and at the death of Mr. E. Birchall, a past president. At the R.I.B.A. Preliminary and Intermediate examinations for the North-Eastern Division of the country, in June and November, 21 candidates presented themselves. The competition among the Associates for the prizes offered by the Society was keener and more enthusiastic than in the immediate previous years, and the work submitted was judged to be of a better and more even quality than had been the case in the three previous years. The silver medal and prize of five guineas given by the President for the best measured drawing of any ecclesiastical or domestic building erected anterior to A.D. 1800, was awarded to Mr. Martin Shaw Briggs, for measured drawings of Swinsty Hall, Yorkshire. A special prize of three guineas was awarded to Mr. P. A. Horrocks for measured drawings of Hall i' the Wood, Bolton; the prize of three guineas, for the best design of an entrance lodge and gateway, to Mr. Ralph Thorp; the prize of two guineas, for the best essay on "Modern Street Facades in Leeds," to Mr. Martin Shaw Briggs; and the sketching prize of three guineas to Mr. J. C. Procter. The Council report that no further steps have been taken to create a chair of architecture at the Yorkshire College.

Mention is made in the report of the Council's active interest in the proposed laying out of Victoria Square, and also in the improvement of City Square. In regard to the former it is pointed out that the first essential is the enlargement of the square on its southern side, the present area being totally inadequate to receive any architectural treatment which would be in scale with the Town Hall. In regard to City Square the President formed one of a deputation from the Society to the Improvements Committee, and asked that a new frontage line at the south-west corner between Wellington Street and Quebec Street should be adopted corresponding to and exactly repeating

the building line of the Standard Assurance Buildings on the opposite side of the square, and also that the building to be erected on the vacant ground should harmonise, and as far as possible correspond in outline and skyline with the Standard Assurance Buildings. It is satisfactory to record that this suggestion has been adopted. The Council express their gratitude for the valuable collection of architectural works bequeathed to the Society by the late Mr. E. Birchall, and intimate that steps are being taken to deposit the Society's library with the City Library authorities for better security and supervision.

Mr. W. H. Thorp (Hon. Treasurer) read the statement of accounts, which showed a balance in hand at the end of the financial year of £95 5s. 2d., as compared with £96 8s. 1d. the previous year.

The report and balance-sheet were adopted.

The following Address was delivered by the President, Mr. Butler Wilson [F.], at the Queen's Hotel, Leeds, on 19th November 1903:—

FELLOW MEMBERS, LADIES AND GENTLEMEN,—In rising, for the third time, to deliver my Address as President of this Society, I should be indeed remiss were I not to place on record my intense appreciation of the triple honour you have bestowed upon me: an honour unique in the history of this Society, inasmuch as it necessitated an alteration in your Articles of Association. In electing me to fill this chair for the third successive year you have, in no half-hearted manner, signalled your appreciation of any work I may have accomplished in my previous years of office. Rest assured that there shall be no want of endeavour on my part to deserve and retain your confidence during the coming year. For the ungrudging assistance I have received from the Council and officers I must pay my tribute of grateful thanks. The zealous support which they have accorded me during the past two years has not only done much to encourage me in the work undertaken or accomplished, but permits me to enter upon another year of office with an unhesitating sense of reliance upon their kind co-operation. It is, for the first time, our especial pleasure to welcome ladies to our opening meeting and concert, and, further, to express to them the gratification which they afford us by the grace of their presence at our gathering this evening.

During the past year two of our members have retired from the profession, Mr. John Tweedale and Mr. C. R. Chorley [F.]. We much regret the loss of two such valued members. Mr. Tweedale did much good service in watching architectural interests whilst a member of the Leeds City Council. Mr. Chorley was one of the fathers of the profession in this city and a past President of our Society, in the affairs of which he long took an active part, and of late years the warmest interest. Mr. Chorley has the best wishes

of this Society for his future health and happiness in his well-earned retirement.

Our Library has this year received a handsome addition to its shelves by the generous bequest of 500 volumes by the late Mr. Edward Birchall [F.], a former President of the Society.

In this connection there is one item of interest mentioned in the Report which has now become an accomplished fact. It has long been felt by your Council that the due maintenance and administration of the Library were more than the finances of the Society or the time of the Honorary Librarian would permit. An agreement has accordingly been entered into with the Library Committee of the Leeds City Council, who have undertaken to receive our books as an adjunct to the Central Reference Library. It will be contained there in our own bookcases, and a separate catalogue printed; and in so far as our own members are concerned, it also constitutes a loan library. It remains the property of the Society, which is able to claim its return on the giving of three months' notice. By this arrangement our books are safeguarded against loss or damage. The Central Reference Library already contains a fine collection of architectural works, and Mr. Hand, the public librarian, is giving his attention to the classification of books which deal with distinct arts and sciences, and hopes that his Committee will shortly issue departmental catalogues of this nature. Given these facilities and accommodation, our students will benefit by being able to consult that which, in combination with our own, will be an excellent collection of architectural works.

Your Council has kept a not unwatchful eye upon such local affairs as come within its province. A proposal was recently placed before the public for the architectural laying out of Victoria Square, plans and models being exhibited. The scheme embodied no new idea; it was simply a resuscitation of a similar proposal which was combated by our Society so far back as 1880. Owing to a protest against the scheme, which we again felt it our duty to make, your Council was invited to meet Mr. George Frampton, R.A., the author of the proposal, and the Chairman of the Corporate Property Committee, to place before them our objections. We pointed out that before any architectural adornment of the Square could be entertained the Square itself would have to be much enlarged on its southern side, and that until such wished-for consummation it was much better left undisturbed. We were fortunate in being supported in our contention by both Press and public. The *Yorkshire Post* observed: "The attitude of the Leeds and Yorkshire Architectural Society is a reasonable and valuable contribution to the discussion. It is, in a word, not so much the plan as the insufficient space for its proper display that is at fault. Actual demonstration would soon settle

this point, and the Architectural Society's suggestion of a full-sized rough model of the balustrade and retaining wall, erected on the spot, seems a very practical one." I am happy to say that the scheme was ultimately abandoned; but the fact that the City Council, instead of setting back their building line, are permitting the rebuilding of a tavern on the south side of the Square points to a deplorable consequence—that our noble Town Hall will have to wait indefinitely for that spacious foreground which is necessary to its just and adequate appreciation.

The buildings at the junction of Quebec and Wellington Streets being removed, a deputation from this Society waited upon the City Improvements Committee and represented to them that any new building should be a repeat in contour, mass, material, and skyline to that of the Standard Buildings. This, it was pointed out, would lend a much needed air of symmetry and balance to an important open space, and was made plain to them through the medium of a composite photograph which is exhibited here to-night. I am glad to state that the Committee not only received our suggestions in a most favourable spirit, but decided to endorse them in fact, which is further cause for congratulation.

By the munificence of Colonel Harding and the genius of Thomas Brock, R.A., we now possess one of the finest equestrian statues in the world. It resembles in its general lines the famous equestrian statue of Bartolomeo Colleoni in the Campo San Giovanni at Venice, which is passed on the way to the *traghetto* whence the island of Murano is reached. This statue was designed and in part executed by Verrocchio, but on his death the work was completed by Leopardi. Although based to some extent upon the Colleoni, Mr. Brock's fine work has a power and distinction which are all its own, and is an object which Leeds may count itself fortunate in possessing. The subsidiary features executed by Messrs. Drury, Pomeroy, and Fehr are also fine examples of the sculptor's art; but, taking the treatment of the Square in its entirety, I am inclined to think that it is neither kind nor fair to the surrounding figures, however beautiful in themselves, to place them at such obvious disadvantage as their proximity to the principal feature entails. Nor can it be pleaded, I apprehend, that the equestrian statue is in need of their assistance. How much the value of the admirable figures of our Leeds worthies would be enhanced were they each placed in some isolated and well chosen situation! The *tout ensemble* demonstrates the hopelessness of attaining a successful result unless the scheme is the outcome of individual conception carried to an ultimate conclusion by one guiding hand.

During the last few years Leeds has seen the sweeping away of vast blocks of dilapidated and insanitary property and the upraising of structures,

whether beautiful or not, at least fitted with every modern convenience and appliance. Broad thoroughfares have appeared, some of them leading to nowhere in particular. The Electric Tramways have created, whether legitimately or not, an inclination on the part of the authorities for rounded street corners; an inclination which has developed into a mania, born, I presume, of a passion for the curve of beauty.

Whilst upon the making of new streets, one is constrained to consider whether our arteries of traffic can be diverted by the tempting prospect of a broad thoroughfare which is even a little off the main line. The answer is emphatically No! It is easier to turn the course of a river than to divert the natural stream of a city's traffic. That stream will pursue its natural tenor however restricted the confines. The moral would seem to be that it is wiser to spend money upon widening the existing natural veins of traffic rather than upon the creation of new thoroughfares in the midst of which one may stand, secure from harm, and listen, amid their spacious silence, to the rumble of traffic in the congested but natural artery only a few yards away. It is pleasant, of course, to possess these fine streets, so quiet and peaceful, where one is enabled to indulge in musings, so far from, and yet so near the madding crowd. But I submit that it is somewhat expensive. Piecemeal improvements are futile unless they form part of a prearranged scheme. After the Great Fire London missed its chance for evermore of rising from its ashes and taking the shape of a nobly planned city, owing to its neglect of the admirable plan for its reformation which was prepared by Sir Christopher Wren. No such mistakes were made by Paris and Washington. I do not suggest for one moment that we are in a position to follow their example to the full, but surely we can do something in such direction. As a means of thoroughly realising the position, I would propose that a map of the city be prepared with the streams of traffic shown, and the varying density of such traffic indicated by distinctive colours. Street improvements should be guided by that record. Do not railway companies, when asked for additional trains, commence by checking the number of passengers they are carrying, and so arrive at a decision?

An interesting Paper on this question was read before us last Session by Mr. Musto, one of our members, who went to great trouble in preparing plans illustrative of his ideas. One of these, referring to the widening of Vicar Lane, is exhibited here this evening, from which it will be readily seen that this street, instead of pursuing its present aimless wanderings, could, with a little forethought, have been constructed in a perfectly direct line from the Dispensary to the New Markets without additional expense.

Our Society has been twitted with the remark that it always raises its voice after the event, when

it is too late to adopt our suggestions. We contend that we cannot suggest improvements in schemes of which we have no clear and definite knowledge, and that such intentions should be frankly made known both to the profession and the public. The City Council reply that they must conceal their intentions, or owners will unduly inflate the price of land which it is ultimately intended to purchase.

They do not work on this principle of secrecy in Paris. They pursue a directly opposite course, with results the success of which is beyond contention. We will see how much secrecy enters into their mode of procedure, which is as follows: Plans are prepared fully to demonstrate the scheme, and it is announced by means of placards and newspaper advertisements that an inquiry will be held. For fifteen days the plan is publicly exhibited in order that citizens and others interested may examine it and record their observations in writing. One would think that this would suffice to ventilate public opinion; but they court still further criticism. For three additional days a specially appointed agent attends to record all verbal observations made to him regarding the scheme. The agent also prepares a full report, giving his own opinion on the scheme, which is forwarded with all other documents to the City Council, and, should it be determined to modify the scheme, a revised plan is exhibited. The plan and reports are then submitted to the Ministry of the Interior, which controls the whole of the thoroughfares of France. If approved, the scheme becomes effective by the signature of the Chief of the State to a declaration of its "public utility."

The idea that the proposals of our City Council can be altogether concealed is, I contend, fallacious. If I am wrong, and it is a fact that there is successful concealment, then Leeds ought to feel proud indeed in the possession of a corporate body and an official *personnel* from whom nothing short of rack or torture chamber can drag prematurely the secrets which they have sworn to keep inviolate.

And now a few words to our Associates, to the younger members in whom we place all our hopes for the future of this Society, for architecture respected as an art and a profession. In my first Address I took occasion to speak to you of the value of enthusiasm. There is nothing worse than the lack of this quality unless it be its misapplication. On the second occasion I referred to the difficulties which beset the path of the enthusiast; and I did something more, I suggested a remedy—namely, education; a curriculum which will point out to the student the direction in which his enthusiasm can be best expended. Your Council have now provided every facility in their power for students in this neighbourhood to study architecture and prepare for the Examinations of the Royal Institute. The enthusiastic will take

advantage of these facilities; but what of the others? How are we to induce them to do likewise, and so leave behind us men who shall be properly qualified for their profession?

Parents and guardians must be brought to see that for a youth to become an architect he must pass through a specific educational course of training. But what experience or data have such mentors to enable them to judge of what qualifications an architect should possess? Architecture does not stand in the public eye with the same solidity as law or medicine. These professions stand secure, exalted on pedestals the steps of which are both difficult and costly to climb. And when I speak of the architect's status, if, indeed, he possess any at all, I do not allude to that somewhat hazy and sentimental status which is grudgingly given to the leading lights of our profession—I am speaking of the rank and file. Medical men, lawyers, and others occupy definite places in the world. An eminent King's Counsel, who was cross-examining an architect of repute, led off by saying, "You are a builder, I believe?" "Pardon me," replied the witness, "I am an architect." "Pretty much the same thing, isn't it?" remarked Counsel. "Not at all," was the reply. "But," said the K.C., "there was no architect for the Tower of Babel." "No," responded the witness, "hence the confusion." The status of the architect is less defined than that of a hansom-cab driver. You have to qualify and obtain a licence before you can drive a cab. Your vehicle must be in proper order; it must pass the authorities so that the public may engage it with some degree of confidence.

The majority of parents and guardians have no idea what is required to make their sons into architects; or, if they have, they do not live up to it, or are unwilling to allow the time or the money for the necessary training. Well, under present circumstances, can we blame them? Even the youths themselves think they know a cleverer game than spending long years in acquiring the groundwork of their art. They go through a short, slipshod, aimless course of training, and are then pitchforked into the profession through the inexpensive medium of a brass plate and a terra-cotta catalogue.

Often the student goes a little further than this; he passes the Preliminary and Intermediate Examinations of the Institute, but shirks the Final. When remonstrated with, he maintains that Associateship of the Institute is not essential, and points in support of his contention to, at any rate commercially, successful practitioners who have passed no examination and are members of no Society. But we are not concerned, at the moment, with money rewards. What we are anxious about is not commercial success but successful architecture.

What incentive can we place before our students? How can we make it possible for us to say, "We are going to make you educate and qualify yourselves before we shall allow you to practise as architects"? This, I think, would be a powerful incentive, and I hope the time is soon coming when we shall be in that happy position. As you are aware, the event which we believe would conduce to this result is registration—with the support of which this out of many allied Societies has identified itself—the Statutory Registration of Qualified Architects.

A large majority of the profession in the kingdom has voiced registration in no uncertain tone, and its endeavour is to prevent any person styling himself an architect who is not fully qualified to practise as such.

The Legal and Medical Acts were of incalculable benefit both to practitioner and public, and we seek a like recognition. This will be the incentive that we shall hold out to our students. They will have to qualify in order to practise. The boot will be on the other leg—they, the students, will become anxious and earnest in their endeavours. They will have to avail themselves of the educational advantages which we older men have worked so hard to obtain for them. It will attain a glorious end, namely, the raising of the standard of architecture throughout the country. It will attract the best men and weed out the incompetent.

Registration, like every other progressive movement, has its opponents. It has recently been declared that the leaders of the profession are strongly opposed to the proposal. I take exception to this statement. On the contrary, Sir Wm. Emerson in his Presidential Address at the Institute in November 1900 said: "There is good reason to hope that in the near future any well-considered scheme emanating from us for giving a legal status to any qualified practising architect would receive the favourable consideration of the Government." Mr. John Slater, Vice-President of the Institute, speaking at Manchester in December 1902, said: "If registration were to come and be a success, it could only be through the action of the Royal Institute. I am not altogether without hope that in the not far distant future some practical means of bringing that about will be found." The small number in the profession who oppose registration contains no more distinguished names than do the ranks of its supporters. The passing of the Medical Act was opposed by an insignificant minority, which contained eminent men, whose sole reason for opposing it was probably the very eminence and security which they themselves had attained, and an indisposition to help others to the same end. The present state of affairs is somewhat parallel to that existing in the Transvaal before the late war, when the governing minority declined to hearken to the vast majority whose wishes they were elected to

represent—a situation which became too intolerable to be endured.

If the anti-registrationists are as much in earnest as they profess to be, they could not adopt the do-nothing, negative policy which of intention pervades their somewhat scanty ranks. They do nothing, and, what is more, they don't mean to do anything. But when our majority is thoroughly organised, as I hope it soon will be, they will cease to be reckoned with. They affirm that no amount of legislation and the training inseparable from it will protect the public from a certain amount of bad design. Granted; but it is equally true that our scheme and its attendant education will give this country much better design, and so foster a taste and desire for much better design than at present exists.

They further doubt the feasibility of determining what qualification should give any man a right to style himself and practise as an architect. They say, "Who is to decide?" The Institute at present finds no such difficulty: it has its own examinations and qualifications for the same, so that argument is easily disposed of. Again, it is urged that no man has a claim to the title of architect until he has designed and completed buildings; but the speculative builder would fulfil these conditions. One might as well argue that no man has the right to style himself "doctor" until he has killed off a certain number of patients.

The question naturally suggests itself, Who compose the minority opposing a movement which the great majority feel to be in the best interests of architecture, and why do they oppose it? I will go further than say, "They combat the scheme because they personally have nothing to gain by it," and will suggest that they may have a good deal to lose by such a measure; that their opposition is prompted by other than unselfish and disinterested motives. There may also be those amongst them who possess an indifference to the general well-being of the profession which comes of some state of independence which we are not all privileged to occupy; some who have axes to grind and others who wish to pose as superior persons. Then, of course, there is the individual whose only claim to distinction rests on the fact that he belongs to no institution whatever. The selfish man who stands aloof from all brotherhood is perhaps best left alone in his self-imposed isolation. When such an one remarks, "What good would your Society be to me?" I reply, "What good would you be to our Society?" Our opponents humorously profess intense sympathy with every effort to raise the status of architecture and the architect in this country, but they do nothing towards that end. After a lot of stirring up the Council of the Institute come forward with a belated and borrowed suggestion for a Board of Architectural Education. This is what the mountain in labour has given birth to. Is the Council occupying

a dignified position in putting forward a scheme which it admits is drawn up by well-known architects, not members of its own body?

Those who are opposed to registration are unskillfully drawing a red herring across the trail in the shape of this proposed Board of Architectural Education, a suggestion which, however good it might have been years ago, has been too long delayed, and arises too coincidentally with the recurrence of the registration movement to appear clothed in any garb but that of the most dimmy sincerity. Board of Architectural Education, indeed! after the Allied Societies have been for years struggling for, and in many cases succeeded in establishing, such bodies. Where was the first chair of architecture established? London? No!—Liverpool and Manchester.

The move is too transparent. They would give us any food but that which we ask for; offer us no more than the very sustenance which we have practically obtained, certainly far more in the provinces than in London. Ours is not a negative but a progressive policy. The rapidly diminishing ranks of the anti-registrationists on the Institute Council are waking up to the fact that registration is looming very large, and that they may soon be overwhelmed. Having reached the end of their resources, they grasp at any rag which they may wave to distract attention from the main issue, and even go to the length of admitting their unwillingness to represent truly the feelings of their members. They must be fighting for their very existence when they have to call in outside help from men who, for reasons best known to themselves, ignore the Institute as being a factor in the profession. Could anything be more humiliating? We are told that there is no probability of getting what we want—a higher appreciation of architecture—by legislation. Perhaps not, unless we exert ourselves. They would try to discourage us by every means in their power, but the already valuable results of our own efforts place us beyond the stage where discouragement can have any effect.

I hope at the next election of the Institute Council that the question whether candidates are in favour of registration or not will be rendered even more acute than at the last election, when, without organised effort, we succeeded in placing thirteen declared registrationists. There are still about a score members who are neutral. But we must insist on their declaring themselves one way or the other, so that we know which way to vote. You cannot get anywhere by neutrality. It is not a quality which makes for advancement.

To render the co-operation of the Allied Societies effective, I shall propose an association between us which would make registration the crux of the next elections.

Besides the large number of metropolitan members who are in favour of the movement, there are

450 Fellows and Associates scattered amongst the Allied Societies. A carefully organised campaign should easily place the registrationists in a majority on the Council. This is the work to which we must devote our energies during the coming Session. The Allied Societies should band themselves together and nominate candidates who will pledge themselves to use every endeavour to effect registration. We should vote solid for our nominees and smash up what was graphically described by Mr. Cannon from this chair in 1885 as "the crab whose capacity for natural expansion is confined within the bounds of an unyielding shell."

To be compelled to expend our exertions in the direction of organisation and agitation is far from being congenial to those who practise a peaceful art; but the work of the world is various and has to be accomplished by persons variously endowed. Work of this character may be foreign to the natures of many amongst us. The responsibilities of office fall to each in turn, and it is ordained that some part of our lives shall be spent in the service of the community, for the general well-being of the art which we follow.

Our objective is the renaissance of a cult whose disciples shall have well studied those arts and sciences which make for beautiful building, and not until that objective is reached can we expect them to mould those elements into an architectonic entity.

The Royal Institute of the Architects of Ireland.

A general meeting of the members of the Royal Institute of the Architects of Ireland was held at 20, Lincoln Place, on Thursday, November 5th, at 4 o'clock p.m. Mr. G. C. Ashlin, President, in the chair. Also present, Messrs. J. Kelly Freeman, R. Caulfield Orpen, C. A. Owen, Joseph A. Geoghegan, J. Charles Wilmot, James H. Webb, J. Rawson Carroll, Edwin Bradbury, W. Kaye Parry, Geo. P. Sheridan, W. M. Mitchell.

The ballot papers for the election of Honorary Secretary and Honorary Treasurer were examined, and the President announced that Mr. R. Caulfield Orpen had been elected Honorary Secretary and Mr. Charles Ashworth Honorary Treasurer of the Institute for the ensuing three years. Mr. J. Rawson Carroll moved and Mr. William Mitchell seconded the following resolution, which was carried unanimously: "That the Institute at its General Meeting take the opportunity of placing on record its hearty appreciation of the indefatigable energy and tactful skill which Mr. Kaye Parry has displayed in carrying out the duties of Honorary Secretary to the Royal Institute of the Architects of Ireland during his term of office."

A cordial vote of thanks to the outgoing Honorary Treasurer, Mr. C. A. Owen, was moved by Mr. W. Kaye Parry, seconded by Mr. R. Caulfield Orpen, and carried unanimously.

Bristol Society of Architects.

At the opening of the Session on Monday, the 16th November, the President (Mr. Joseph Wood [F.]) entertained the members of the Council at dinner, after which a smoking "At Home" was held at the Fine Arts Academy, Clifton. The President's hospitality met with a gratifying response in the presence of a very large gathering of members and architectural assistants and pupils, who inspected with the greatest interest a large collection of admirably executed sketches and measured drawings, the result of the work of a long period of years by the President and his late partner, Mr. Foster. Many of the sketches dated from the early "forties," and illustrated bits of old Bristol that have now disappeared. After refreshments had been partaken of, the President addressed a few words more especially to the student members, impressing upon them the desirability of maintaining enthusiasm in their studies by sketching and measuring good examples of old and modern work.



FIG. 1.—ROYAL VICTORIA HOSPITAL, BELFAST: VIEW FROM THE NORTH-WEST.

ROYAL VICTORIA HOSPITAL, BELFAST: ITS INITIATION, DESIGN, AND EQUIPMENT.

By WILLIAM HENMAN [*F.*] and HENRY LEA, M.Inst.C.E.

I. By WILLIAM HENMAN.

I VENTURE to appear before you this evening, trusting that some particulars of the Royal Victoria Hospital, which was opened by their Majesties the King and Queen when they visited Belfast on the 27th of July this year, may be of value to those interested in hospital development.

There is much that is unique in its inception, original in its design, and novel in its equipment which has naturally attracted attention to this hospital; but being located in the Sister Isle it is not easily accessible to all who may desire to understand it, and therefore it appears to be advisable that an authentic description should be published of the reasons which led up to what has been termed a "revolution in hospital design," as well as of the methods and means by which it has been accomplished.

Incorrect description or misapprehension of what prompted so radical a change in plan is liable to prejudice improperly those who fail to realise the objects aimed at. The tendency is to follow beaten tracks, and only those who have good reasons for departing therefrom should venture to cut out a path for themselves; but having done so, they alone are able to describe what was observed and encountered by the way; consequently it may depend upon the ability of observation and power of description exercised by pioneers whether a new way may become a beaten track or will remain neglected.

Independent action doubtless has its dangers, and frequently arouses alarm in the minds of those simply content to follow in the footsteps of others—never venturing to question whether there may not be a better course to pursue.

I make these remarks because since the buildings have been seen in their completed condition surprise has been expressed at their internal airy cheerfulness, several visitors

having remarked that believing them to be only lighted by "skylights," none of which could be opened, they expected to find the wards dreary and stuffy. Prejudiced as they were by imperfect and incorrect description, some had evidently come expecting to condemn, but I have good reason to believe that none went away failing to approve.

Although I cannot show you the actual buildings, by an inspection of which you would be the better able to judge as to their merits in the directions aimed at, yet by the aid of drawings and photographs, together with some explanation, you may, I hope, realise that even if the plan is revolutionary in its tendency, it is no unreasoned fad, but a serious endeavour to simplify and, if possible, improve hospital design.

Whether it is destined to secure permanent approval or be pointed at as an example to be avoided depends—first, whether the essentials in hospital design have been properly appreciated and applied; secondly, whether those having the care and management of the institution will maintain it in efficiency—for it must be remembered that the more perfect an instrument is for accurate and effective work the more worthy it is of careful upkeep, and the more easily it may be rendered faulty by neglect or improper usage.

As the subject may be new to some present, it is necessary to revert to what may be well known to others; I therefore crave indulgence while referring to what led to the development of this design. It is, I believe, acknowledged by those who have studied the subject that distinct variations in hospital-planning have been principally brought about as knowledge has increased of the necessity for efficient ventilation, and of the means by which it can be secured. If that be granted, then it ought not to be surprising that with mechanical means at our disposal an attempt should have been made to design a hospital suited to be efficiently ventilated by such means, and that at the same time good engineering skill should be brought to bear, so that the mechanical appliances may be of the best, and thoroughly suited to the requirements of the building.

I have not the least desire, at the present time, to raise controversy on the subject of mechanical *versus* natural means for securing ventilation, for it must be evident to all that without mechanical means it would be impossible properly to ventilate such a block of building as this which we are considering. I enter no plea now for the adoption of mechanical means for securing ventilation. To my mind, and that of many others, judgment has already been given upon the principle, and it would now be as unreasonable to condemn the employment of mechanism for securing ventilation as it would be to assert that sailing vessels can compete with steamships for speed, carrying capacity, or punctuality, and would suffice for the commerce and navies of the world. Yet, although the principle has been conceded, there are many questions as to the best methods and appliances to be employed. It is over twelve years since Mr. William Key, of Glasgow, proved the possibility of securing efficient ventilation on the "Plenum" system, and as that is undoubtedly the most suitable for hospital purposes I am greatly indebted to him for devising the means by which it can be practically accomplished. Discrimination and increased knowledge are still wanting as to what constitutes efficient ventilation under varying circumstances; but, judging from the advance in favour accorded to the means and methods introduced by Mr. Key, "Plenum" ventilation has come to stay, and in my opinion it behoves us as architects to master its details, and apply them with judgment for the benefit of the public.

When the Committee decided to employ "Plenum" ventilation throughout the large General Hospital at Birmingham, ten years since, the opposition which faced me was, to say the least, disquieting, and it was somewhat unfortunate that the building was designed before it was determined it should be mechanically ventilated, for it entailed many constructional difficulties which had to be overcome. I have reason also for regretting that, contrary



FIG. 2.—THE PRINCIPAL ENTRANCE, ADMINISTRATIVE DEPARTMENT.



FIG. 3.—VIEW FROM THE SOUTH-WEST

to my opinion, the residential staff and nurses' quarters were included in the scheme; for although I believe efficient ventilation is secured throughout, the cost of upkeep is unduly increased by mechanically ventilating a large section of the buildings consisting of numerous small rooms, occupied only for a few hours at a time, which could have been reasonably ventilated by simpler methods, and by opening the windows when the rooms are unoccupied. The temperament of people in health varies so greatly that, when deprived of the right to open or close a window at will, it is next to impossible to persuade them their rooms are efficiently ventilated, and however good the system may be, some will unreasonably condemn it.

In the wards of a hospital, however, the conditions are entirely different. Occupied throughout both day and night by a number of patients in a low state of health, continuous change of air with an equable temperature and freedom from draughts, secured without noise or dirt, is an ideal state in which health and strength may be regained. The question consequently resolves itself into, How can hospital wards be designed and arranged so as economically and effectively to secure those desirable conditions? Such was the problem which for some time had occupied my mind when correspondence appeared in *The Builder* suggesting that, "in consequence of the proved success of 'Plenum' ventilation, combined with antiseptic treatment, it might be possible to dispense with the 'Pavilion' arrangement of wards," such change being principally advocated in the interests of more effective architectural treatment of the buildings. To this end were advocated double wards divided longitudinally by dwarf partitions. This suggestion appeared to me to be altogether wrong, so I wrote the following letter which appeared in *The Builder* of the 8th August 1896:

SIR.—Although the time may be at hand when it will be possible, by the employment of scientifically-applied means of ventilation and of the antiseptic treatment, to adopt an arrangement of plan differing from single-ward pavilions, the question demands closer examination than "F.R.C.S." and "Architect" appear to have devoted to it, for fear of a retrograde movement.

The point upon which they place so much stress—viz., architectural effect—is of slight importance to the welfare of patients and ease in administration, which in a hospital ought to receive first consideration, and other reasons given for reverting to double-ward pavilions are trivial. In fact, I venture to say that by far the majority of those who have had practical experience in hospital work will condemn the dwarf central division, because it obstructs a full view of the beds, and because it is not possible to so thoroughly light a wide ward; for it must be remembered that, although in a single ward a patient now and then may be inconvenienced by glare of light, that light is, in effect, the great health-giver to by far the majority. Ventilation, by whatever means secured, becomes more difficult in a large area, and a central division must retard free circulation of air; moreover, such enlarged spaces would demand greater height, which would further increase the difficulty of securing efficient ventilation, and add to cost as well as to labour in getting from one floor to another.

The real disadvantage of the pavilion plan, particularly in some of the large and recently-erected hospitals, is that of administration, in consequence of the great distances which have to be traversed by the staff; the direction, therefore, in which advance should be sought is concentration of wards, which becomes possible with an efficient system of ventilation and the employment of antiseptics.

Hospitals and infirmaries may be considered "health factories," and the arrangement of plan should, as in an ordinary manufactory, principally be considered with a view to perfection of work and its accomplishment with ease and despatch.

What I would suggest is that, instead of erecting detached pavilions of several stories, it might be better to spread out the wards on one story only, placed side by side and lighted by continuous lantern lights. Such an arrangement would secure greater comfort to the patients, simplify ventilation by mechanical means, and very considerably reduce corridor communication, as well as dispense with the inconvenience of staircases and lifts, thereby facilitating administration.

For the accommodation of the staff there would be no objection to buildings of several stories,

SCALE OF FEET.

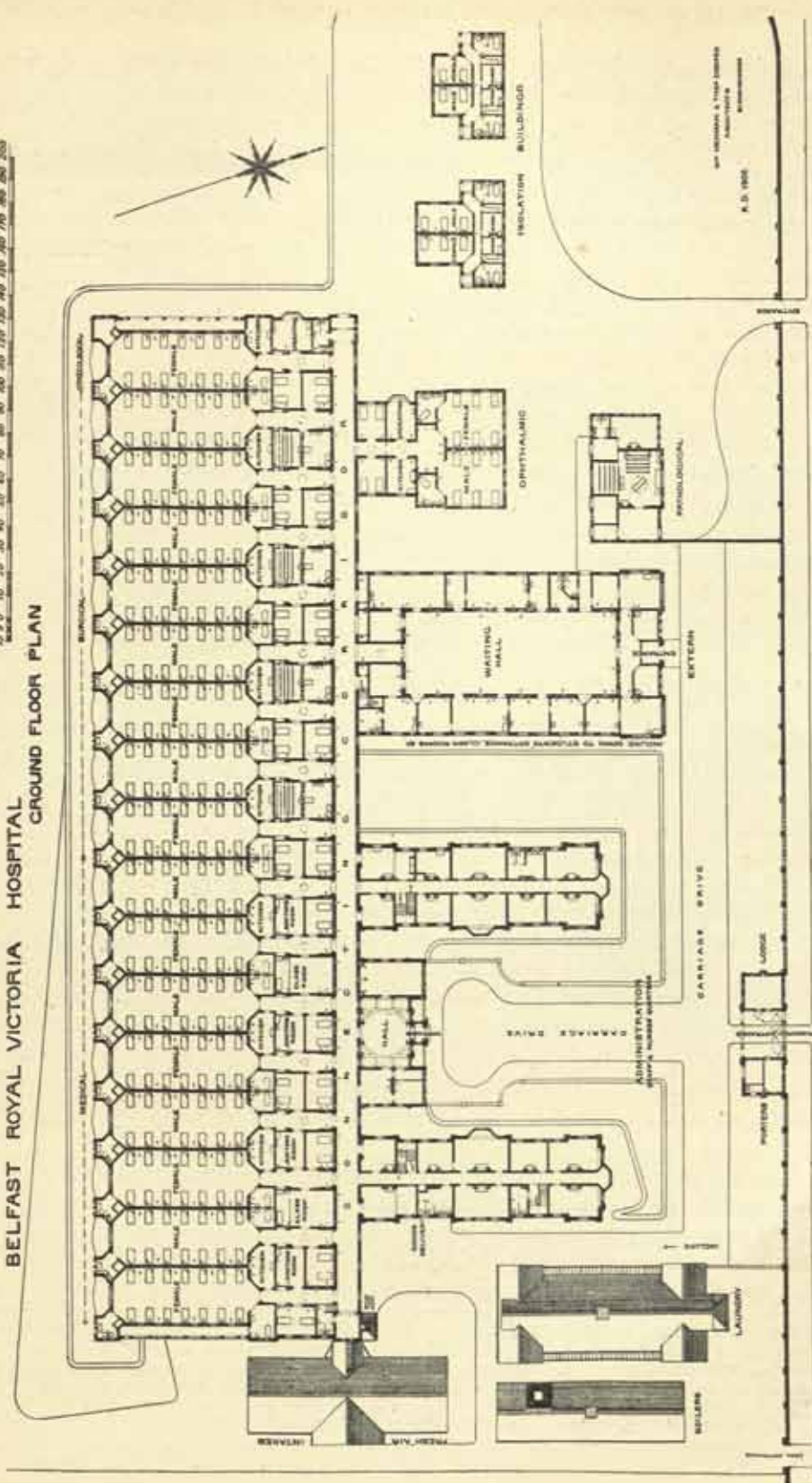


Fig. 4.

but with all the patients compactly arranged on one floor level their wants could be easily supplied, and other difficulties of the pavilion plan would be overcome.

I am fully aware that only those who study what is possible with the plenum system of ventilation properly applied can realise the practicability of such an arrangement; yet by its employment I feel convinced that some such revolution in hospital planning will be accomplished, and do not doubt that in time it will be demanded, partly in consequence of the great cost of the pavilion plan, but more particularly in consequence of the excessive labour thereby involved.

WILLIAM HENMAN, F.R.I.B.A.

It never occurred to me, when that letter was published, that it would ever fall to my lot to design such a building for execution. Yet some three or four years later I was requested to meet the Committee of the Royal Victoria Hospital, Belfast, funds for a new building having been collected as a Jubilee Memorial to our late Queen, mainly through the untiring energy of Mrs. Pirrie, whose husband, the Right Hon. W. J. Pirrie, was at the time Lord Mayor of the city. When discussing the general arrangement of plan with the Committee, reference was made to the suggestions contained in the above letter, and I was questioned as to the practicability of constructing a hospital such as I had proposed. A majority of the Committee being favourably impressed with the assurances I was able to give, sketch plans were demanded.

On attempting to fit together, on entirely new lines, the intricate requirements of a complete hospital for 300 patients and a large staff, I began to realise the difficulties I had imposed upon myself. After several attempts and minor compromises in respect to some of the accommodation thought to be necessary, and with the able assistance of my partner, Mr. Thomas Cooper, the plan in time assumed the generally symmetrical arrangement in which it now appears an erected building; but ere it reached that stage, opposition was raised by some members of the Committee, and outside influence was brought to bear against the scheme. Of this we had no reason to complain, for we learnt that Belfast men can be just and considerate in opposition and are open to conviction. Some we know went to considerable trouble, visited other hospitals, and consulted supposed authorities to obtain evidence against the adoption of the plan. It was an anxious time when the Committee met to decide the question. The Chairman (Mr. Pirrie), the late Dr. Cummin, and others who advocated the scheme, after careful study of the proposals, stuck to their guns, but there was a strong opposition and some waverers; the matter hung for a time in the balance until Professor Byers, a member of the Council of the British Medical Association, and an hon. member of the medical staff, rose and spoke to this effect: "When first he heard that it was proposed to place all the wards side by side without intervening open spaces, to light them principally from above and to have no windows to open, it appeared to him so contrary to all his preconceived ideas on hospital design that he determined to oppose the carrying out of such a plan by every legitimate means; and, to enable him to do so effectually, he set about independently to study the subject in all its bearings; but, to his surprise, the more thoroughly he probed it the more and more convinced he became that Mr. Henman was right." He then went over the principal arguments for and those advanced against the scheme, and it was proposed that, subject to the general requirements of accommodation, "the architects be requested to develop the plan in such a manner as in their judgment would best meet the demands of the principle of a one-story hospital, with the wards compactly arranged side by side."*

* No record was kept as to what Prof. Byers said on that occasion, so I sent him a draft of what I have just read and asked for his personal experience of the working of the hospital, to which he kindly replied thus: "I remember quite well the incident, and may add that, after a trial of two months, the new hospital has more than fulfilled my expectations."

"The 'Plenum' system of ventilation and heating works admirably, and whether from the point of view of administration, ease and comfort of patients, or adaptability to clinical teaching, I know no hospital equal to it. We have had many visitors, and all regard the New Royal Victoria Hospital as unique of its kind."

Such forcible advocacy from a medical man of standing, until then absolutely unknown to us, took everyone by surprise, and the resolution was almost unanimously adopted. Thereupon several advocates of the scheme became enthusiastic with regard to it; ideas as to the accommodation to be provided enlarged, and we were led on to elaborate the architectural character, but again we experienced a check. Tenders for the erection of the buildings were received in the early spring of 1900—just when prices had run up abnormally, and little was thought of but the disasters of the South African war; the cost came out at a higher figure than was expected, and beyond the funds at disposal. No one had heart to appeal to the public for increased subscriptions, and no course seemed open but to bring down the accommodation to original requirements and to simplify the architectural



FIG. 3.—THE CONNECTING CORRIDOR.

treatment. This gave opportunity to a section of the Committee for reopening the question of the arrangement of plan, and, in addition to repeating objections previously raised, they urged it must be expensive; but fortunately the majority held to the principle of the scheme. In due course the design was modified, and on fresh tenders being procured the work fell to Messrs. McLaughlin and Harvey, contractors of Belfast, who have carried out the buildings in a very satisfactory manner, Mr. G. A. Flower acting as clerk of works.

Although one can but regret losing the chance of carrying out a large building of good architectural treatment, I am now inclined to believe that, in the interests of hospital development, things have turned out for the best: for not only would the additional cost have been put down to the particular arrangement of plan, but it is now realised that the annual cost of maintaining a larger establishment would have been beyond the means procurable. The buildings are not unsightly, though novel in character and simple in architectural design,

and when the grounds around are laid out and planted, time being allowed for trees and shrubs to grow, their appearance will doubtless be improved.

The cost of the buildings, including all engineering requirements and a complete steam laundry, is only a trifle over £300 per patient's bed; which is clear proof that the arrangement of plan is capable of being carried out at an economical figure.

The site is an excellent one, being a portion of the grounds of the old Asylum: it was granted by the City authorities with the sanction and, I may say, the approval of the rate-payers. It is six acres in extent, to which another six acres is to be added on the completion of a new asylum which is being erected elsewhere. The hospital stands comparatively high, has a pleasant outlook in every direction, and is readily accessible from most of the large manufacturing works, and from the poorer parts of the city, whence the majority of the patients will come. From west to east there is a fall in the level of the ground of over twenty feet, of

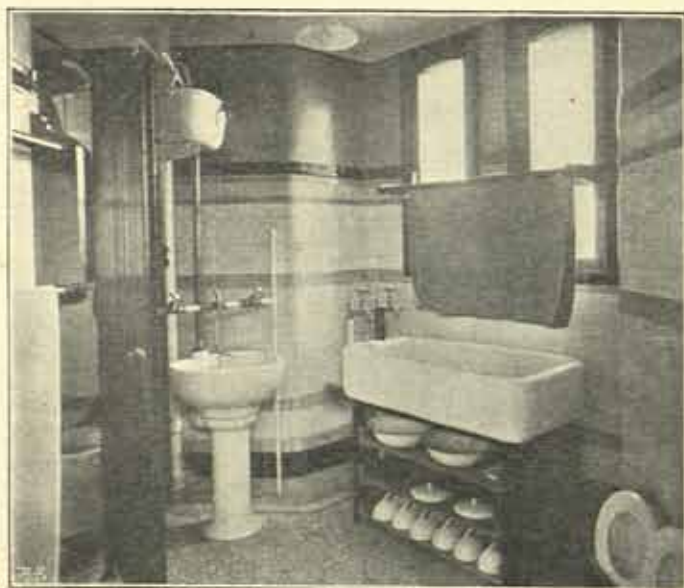


FIG. 6.—A SANITARY TURRET.

which advantage has been taken; by keeping the main floor level well above the ground adequate height is secured for the principal fresh air-duct, which runs under the main corridor, and for the branch ducts conveying fresh air to the several wards and accessory rooms. There is also a pipe-duct running parallel with the principal air-duct—a necessary provision, so that heat from the steam and hot-water pipes may not penetrate the buildings during the summer months, and that convenient access may be obtained to all piping.

The entrance to the site is on the north side from Grosvenor Road, which at that point was several feet above the average ground level; consequently by

making up an entrance roadway to the street level the buildings are approached on the flat and the basements of the east and west administrative wings are retained clear of the ground. These are the only portions of the buildings which are of more than one story, and being on the north side there is no overshadowing of the patients' departments.

The official entrance is centrally placed between the east and west wings. Through an open porch, surmounted by a bronze statue of Queen Victoria executed by J. Wenlock Rollins, sculptor, of Chelsea, is a domed entrance-hall lined with Irish marbles and alabaster. On the right is the Board room, on the left the Superintendent's offices and waiting-room. Opening directly from the hall opposite the porch entrance runs the main corridor from east to west, some 450 feet long and 9 feet wide. Branching southward are seventeen short corridors, giving access to as many wards, each for fourteen beds, with their accessory rooms, all practically under one roof. The eight wards to the east are for medical cases; then come eight wards for surgical cases, and one for gynaecological cases. To the north are two wards for ophthalmic cases.

The arrangement of the wards is on the "unit" principle—i.e. each honorary physician and each honorary surgeon has control of a male and a female ward, with their accessory rooms. To each group of four medical wards there is a class room, approachable without the necessity for passing into the main corridor, and two clinical rooms. To each pair of surgical wards there is an operating room, and, in addition, separate operating rooms for gynaecological and ophthalmic cases. A ward kitchen serves for each pair of wards (except the gynaecological, which department is self-contained). Small wards of two beds each are provided in connection with each large ward; linen cupboards in the branch corridors, also store rooms for patients' own clothing, and conveniences for nurses as well as cleaners' rooms, with slop sinks at the ends of the main corridor.



FIG. 7.—THE CENTRAL HALL OF "EXTERNAL" DEPARTMENT.

Sanitary conveniences are in a turret at the south end of each ward; bath rooms and lavatories at the north end. I may here direct attention to the fact that intercepting lobbies between wards and conveniences are dispensed with. Open windows with "Plenum" ventilation are objectionable, and without open windows intercepting lobbies are an anomaly. By simple adjustment it is possible to ensure that air from sanitary turrets shall not enter the wards, air pressure in their direction being maintained from the wards outwards. This is a matter of importance, because on examination I have frequently found that, notwithstanding intercepting lobbies, when natural means of ventilation are relied on, air is drawn or forced into the wards from the sanitary turrets. This, as I have said, is obviated when "Plenum" ventilation is employed, in addition to which the service of the wards is facilitated, for there is no real necessity for doors, which at busy times are frequently fixed open, and then the intercepting lobby is useless. For the sake of privacy, however, doors are supplied, hung folding

with light spring hinges, through which it is easy to push one's way, even with hands fully occupied, for it often happens that nurses and ward maids have to pass into and out of the sanitary turrets with hands full of breakable articles. Similar doors hung on light spring hinges are provided to all entrances to wards, bath rooms, class and operating rooms, to facilitate the passage of ambulance and other trollies. To the ward kitchens no doors are provided, for with "Plenum" ventilation an equable temperature and freedom from draught are secured; consequently inner doors are required only for the sake of privacy or where difference of temperature is desired to be maintained, such as between the main and branch corridors.

The "Extern," or out-patients' department, is situate between the administrative buildings and the ophthalmic wards, with a public entrance at the north end, right and left



FIG. 8.—ONE OF THE WARDS.

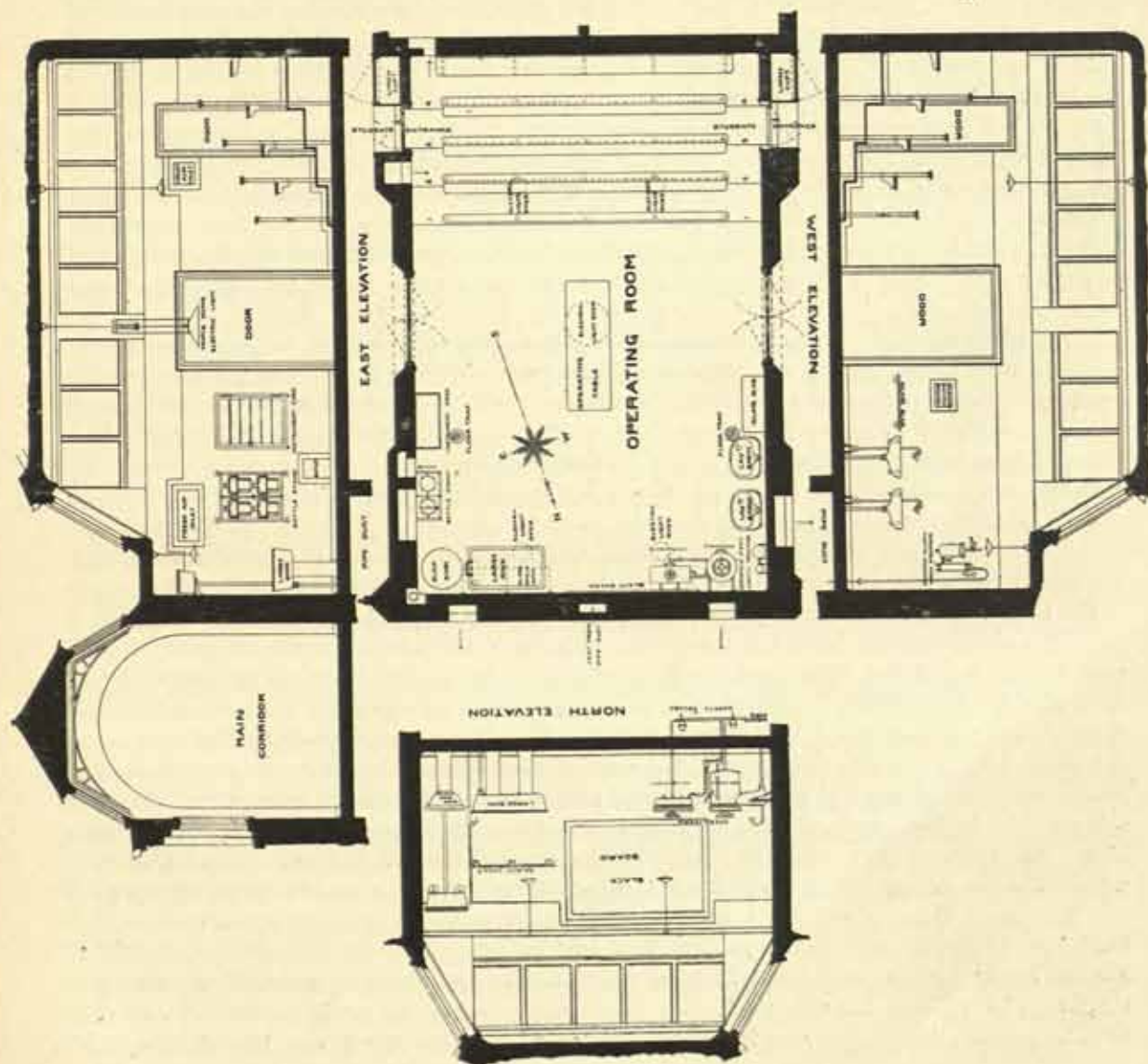
of which are rooms for a charge nurse and the registrar, receiving room for casualty cases, and room for minor operations. Centrally is a large waiting hall, around which are medical, surgical, and specialists' consulting rooms, with several examination rooms. The dispensary is placed near the medical wards, for at this hospital medicines are not dispensed to out-patients.

Students, both male and female, are provided for in the basement of the Extern building, with a stairway up to the main corridor. The Extern waiting hall also connects with the main corridor, as all patients are admitted through the "Extern"; an arrangement which in practice is found to avoid delays and inconvenience, which often happen when there are two or more entrances, and patients go to the wrong one.

Two small detached buildings at the west end of the site are for isolation purposes: they receive fresh air by a continuation of the main duct underground, and, although at least 600 feet away from the fans, are amply supplied with fresh air.

BELFAST ROYAL VICTORIA HOSPITAL

PLAN AND SECTIONS THROUGH AN OPERATING ROOM.



SCALE OF FEET

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Sections through a portion of the ward block give a general idea of the method of lighting, and of the construction adopted. Tie-beams, which would form objectionable lodgment for dust, are dispensed with, support being obtained by means of rolled steel joisting within the roof space, arranged to the form required, strengthened by angle-plates, and riveted together continuously from end to end, resting on the walls dividing the wards, the extreme ends being held down by bolts built into the piers of the outer arcadings.

Only the two outer wards have side windows, not really necessary, but inserted because it was possible to provide them. All the principal wards have large south windows, with casement doors opening on to balconies, and lantern or clerestory lights from end to end on both sides. These are not skylights, as generally understood, but are more properly defined as clerestory windows, slightly sloping, and glazed with half-inch plate glass. All accessory rooms are similarly lighted. So are the main corridor, the extern waiting hall, and the laundry. The result is most perfect lighting to every portion of the building. We were led to adopt an angle of 60 degrees with the horizon for these clerestory windows, in consequence of the researches of M. Trelat, a well known authority on hygiene, his opinion being that, not only is an abundance of light necessary for maintaining a healthy state within doors, but the best light is that which is admitted at an angle of 30 degrees with the horizon. Consequently, it is that good light which is admitted at right angles to the glass, and passes through without being refracted. Surgeons who have seen and utilised the operating rooms inform us that nothing could be better for their purpose, because the light is ample, well diffused, and practically free from shadowing. A proof of this is afforded by a complaint of the photographer, when he first essayed to take views of the interior, that they came out flat and devoid of proper shadowing; but by darkening the windows on one side better photographic results were obtained.

An advantage of "Plenum" ventilation, not always appreciated, is that the cubical contents of buildings may be very considerably reduced. With ordinary haphazard means for securing ventilation, there is a continual demand for more and more space in hospital wards, but given sufficient floor area for nursing and teaching purposes, the height of wards need be no more than appearance demands, and when lighted as they are in this instance the cubical contents are much reduced, being not more than two-thirds of what is ordinarily required, thereby effecting considerable saving in cost.

The arrangement of lantern lights and flat asphalted roofs also facilitates window cleaning, by which a considerable saving is effected, not only in actual outlay, but in damage to the buildings and surroundings by the constant moving about of lofty ladders.

The administrative buildings need little detailed description. In the basement of the west wing is the kitchen department, with serving room on ground floor, about central to the main corridor, to facilitate the distribution of meals. Store rooms occupy the basement of the central block and east wing, and on the upper floors is sleeping accommodation for the superintendent, the matron, 8 resident medical and surgical officers, 76 nurses, and 32 male and female servants, sitting and meal rooms being principally on the ground floor. The corridors are all well lighted, warmed, and ventilated. Each room is provided with a flue carried above the ridge of the roofs, and all windows are constructed to open. Gas fires are provided in the sitting rooms to obviate the necessity for conveying coal about the building.

Having, I hope, given you a general idea of the arrangement and appearance of the buildings, let us turn to the fittings, for I hold that no detail, however insignificant, should be ignored by the hospital architect; he must meet all reasonable requirements of the medical, surgical, nursing, and domestic staff. Unfortunately, one and all of them may differ on important points; but if the architect has had varied practical experience, his knowledge of

constructional requirements, sanitary appliances, and plumbing work should enable him to reconcile divergent opinions, decide what is really necessary, discriminate between the truly useful and merely fanciful fittings at times demanded or put forward by interested manufacturers, and by careful design, judicious selection, and securing good workmanship, the annual expenditure on repairs and replacements may be confined within reasonable limits, and the necessary daily work in a hospital may be performed without excessive labour or irritation.

Our endeavours in this direction were encouraged by the Committee, and the hospital owes a deep debt of gratitude to the indefatigable labours of Mr. and Mrs. Pirrie; for not only have they, in their frequent travels abroad and in America, sought out the latest and best furniture and fittings which could be procured, but Mr. Pirrie's intimate knowledge of shipbuilding and fitting has been freely brought to bear on what may be termed the domestic fittings in the hospital, so that a suitable place has been found for every requisite, and everything is suited to its place.

The increasing difficulty experienced in securing adequate funds for the upkeep of hospitals is a serious drawback to many institutions, and, although by no means an advocate for the cheap and nasty, I am convinced that greater economy could be exercised in hospital design and equipment in a way to reduce annual expenditure; and if our endeavours at Belfast tend to that end, one object we have had in view will have been attained. Work carried on in hospitals is of vital importance, often severely taxing the skill and energies of those who labour therein; consequently, the work of the architect should aim at securing the reasonable comfort and convenience of the medical, surgical, nursing, and serving staffs, as well as of the patients.

In each sanitary turret is a w.c. with lift-up teak seat having the back and front cut away to avoid soiling, the flushing cistern being of glazed earthenware; a slop sink with similar flush cistern, and special contrivance for bed-pan washing, supplied with hot and cold water; a large flat sink for washing utensils and macintoshes, above which are teak rails where the latter can be hung to drain, other rails being provided for them to hang on when dry. Under this sink is a stand, also of teak, with draw-out trays for utensils, and fixed to the wall are racks for bed-pans.

The bath rooms are supplied with a slipper-bath of white earthenware, glazed inside and out. The waste is on the screw-down valve principle, of large bore to discharge quickly into a floor-trap, and the overflow is simply an opening at the side, which also discharges into the floor-trap. Hot and cold water are of course laid on, and there is a single lavatory bracketed from the wall.

The fixed fittings in each operating room comprise two lavatory basins, with treadle taps and lever arrangement, worked by the elbow, for securing either a jet or spray of water; a large sink and slop-hopper, with flushing rim and cistern; a "Berkefeld" aseptic irrigator with steam supply, so that sterilised water can be at once obtained to any required temperature. The sterilisers for dressings and for instruments have been specially designed and made for this institution: the general form was suggested by Professor Kirk, who devoted a great amount of attention to securing a perfectly effective and safe arrangement. After many inquiries nothing could be procured at a reasonable price which would answer to requirements, so experiments were instituted. These were undertaken by Messrs. Millin, of Belfast, who devised an inner coil instead of a double jacket as usually employed, steam being the heating power. Other improvements are a simple wheel action for opening and closing the lids; an indicating valve by which all danger resulting from having separate valves is avoided; and a large dead-weight safety valve to each apparatus. Condense-water

and waste steam are taken into a cast-iron drain placed in the pipe-duct below, so as to avoid nuisance therefrom in the operating rooms.

A stand for aseptic fluid bottles and the instrument case are bracketed from the walls.

Electric switch connections are provided for surgical use, and triple-balanced electric lights are suspended over the operating table—single lights elsewhere. For teaching purposes there is a fixed blackboard and raised seating for students.

In the post-mortem room, special sinks with various valves and wastes, lavatory basins and slop-hopper, are provided, also raised seating for students.

The pathological and microscope rooms have special fittings for the class of work which will therein be carried on.

Throughout the administrative buildings the same care has been bestowed on all the sanitary appliances, the whole of which have been carried out from our designs by Messrs. Morrison & Ingram in the most satisfactory manner, and fixed by Mr. John Dowling, plumber, of Belfast.

As my friend Mr. Henry Lea, who so ably seconded our endeavours by designing all the engineering details in accordance with requirements, has kindly undertaken to explain them, I leave to him to describe the contrivances by which this hospital is lighted, ventilated, warmed, and provided with a continuous supply of hot water.

In conclusion, however, let me say that I have always deprecated the use of the term "model" to any class of building: each should be designed to meet special requirements. It would be presumptuous to suppose we have designed a perfect hospital, one which is to be held up as a model for the future; nevertheless, an entirely new departure has been made, and judging from the favourable opinion already accorded to it by those who have to work therein, or have thought it worthy of careful inspection, we believe it will repay all who are interested in hospital design to study it closely, and should others see fit to follow in our footsteps and, maybe, to improve upon our endeavours, we should consider it a flattering compliment. I must, however, add a word of caution. Good and useful as I thoroughly believe "Plenum" ventilation to be, particularly for hospital purposes, it is essential it should be applied with full knowledge and by those competent to deal effectively with it; distrust every engineer who will give a scheme for ventilating any building indiscriminately on the "Plenum" or "Extraction" system, or by what are termed natural means; but try to realise that every building should be designed for the particular method of ventilation intended to be employed, and that the means for procuring ventilation must be specially designed on scientific principles to meet the actual requirements of the building.

II. THE ENGINEERING WORK. By HENRY LEA, M.I.C.E., M.I.M.E., M.I.E.E.

1. VENTILATION.

MR. HENMAN has truly said that the adoption of the Plenum system of ventilation enables the architect to design a hospital on lines entirely different from those which are commonly accepted; and, on the other hand, I would say that the design which Mr. Henman has originated does in its turn facilitate to an extraordinary degree a simple arrangement of air-ducts of ample proportions. I do not think that the importance of this point has been sufficiently realised; and to emphasise this view I would mention two large buildings now ventilated by mechanical means, each requiring about 13 million cubic feet of fresh air to be driven through them per hour. In each of these buildings electricity, taken

from the public supply mains, is the motive power used for driving the fans. In one building, owing to the liberality with which the air-ducts are proportioned, the total amount of power required to drive the fans is 19 e.h.p.; in the other building, owing to the air-ducts being restricted and very crooked, the total power required to drive the fans is 53 e.h.p. Now, in hospitals where the ventilating operations have to be carried on day and night all the year round, the cost of driving the ventilating fans becomes a matter of serious importance. If we convert the above-mentioned amounts of power into money-value, we find that, taking the cost of electricity at $1\frac{1}{2}d.$ per unit, the power required in one case is costing £766 per annum, and in the other £2,164 per annum. If it be contended that air-ducts of ample proportions and of simple design are too costly in capital expenditure, I would point out that, capitalising the difference, £1,388, between £2,164 per annum and £776 per annum at 5 per cent. interest, we obtain a sum of £27,760. If the whole of this amount were to be expended upon larger and more direct air-ducts, the interest on the extra outlay would balance the saving in electricity, and no particular advantage be obtained. But it would be impossible to devote to the improvement of the air-ducts anything like so large a sum as £27,760; and assuming for a moment that the sum of £3,760 were devoted to the air-ducts, there would still remain a clear saving equivalent to £24,000 capital, or at the rate of £1,200 per annum, in the cost of driving the fans.

Mr. Henman's drawings show the general arrangement of the air-ducts, and it will be seen that as regards simplicity they leave nothing further to be desired. As regards their size, the main air-duct at the end nearest to the fan chambers has a height of 20 feet and a width of 9 feet. The full width is preserved to the far end of the wards block, a distance of 443 feet; but the bottom slopes upwards, so that the height is diminished to 6 feet at the far end. The total cubical capacity of the hospital buildings ventilated on the Plenum system is 703,000 cubic feet. With seven changes of atmosphere per hour in the winter the velocity of the air entering the main duct is 7.06 feet per second, and with ten changes per hour in the summer the velocity is 10.85 feet per second. The proportions of the branch ducts and of the vertical air-flues are based upon similar liberal lines, as are also the air-ways through the fan chambers and the water screens. Herein lies the secret of the reduction of power for working the system. In the case of the Royal Victoria Hospital the expenditure of power per million cubic feet of air per hour is very considerably lower than in any other instance that has come under my notice.

The particulars of the power required will appear later on.

Another point in relation to economical working is that the fans are driven by a steam-engine, the exhaust steam from which is utilised for heating the water for the baths and lavatories throughout the building. The quantity of exhaust steam issuing from the engines is hardly sufficient for the purpose, and has to be supplemented by a small quantity of live steam. The economical effect may therefore be regarded thus: If electricity from the public supply mains had been used for driving the fans, there would still have been required steam for heating the hot-water supply. As the steam for this purpose is now first of all passed through the steam-engines on its way to the calorifiers, it may fairly be said that the saving effected is the cost of the electricity which would have been used if the fans had been driven by electric motors instead of by steam. Taking the mean power required throughout the year at $5\frac{1}{2}$ h.p. and the cost of electricity at $1\frac{1}{2}d.$ per unit, there is a saving under this head of £214 per annum.

Having thus alluded generally to some of the main engineering features of the hospital, I shall now proceed more into detail.

There are two Lancashire boilers, each 7 feet 6 inches diameter by 28 feet long, and there

is room for a third boiler to be put down, if necessary, upon some future occasion, between the boiler-house and the laundry. The steam is led from these boilers through the steam-pipes to the various points where steam is required. The boiler seatings and the steam-pipes at the back of the boilers are arranged so that superheaters may be added. The author fully realises that these appliances would be of very great value, but at the time when the specifications were drawn it was impressed upon him that almost the most important thing of all was to keep the cost of the work down as low as possible, and the superheaters have therefore been omitted for the present. It is hoped, however, that it will not be long before so valuable an accessory is provided. At the back of the boilers are the stack; the condense-water tank, into which all the steam-traps in the building discharge their condense-water; and the pump-house, containing feed-pumps in duplicate for pumping the hot and pure condense-water back to the boilers, together with so much fresh water as may be necessary for making up for steam used for cooking and for some purposes in the laundry, where it is not practicable to recover the condense-water. To the right of the boiler-house block are the north heating chamber, the north fan, the south heating chamber, the south fan, the north and south heating-coils and the north and south washing-screens, the engine-house, and the air-ducts leading from the two fans to the main air-duct.

Fig. 10 shows in sectional plan the arrangement of the engines and fans; fig. 11 shows a vertical section taken on the line *EF*. There are two steam-engines, each of the horizontal type, having cylinders 9 inches diameter by 16 inches stroke. One of them, marked *NE*, lies to the north; the one marked *SE* lies to the south. Either or both of these two engines can be made to drive the pulley *P* by means of the clutches *sc*, *xc*. The belt *B* drives the fan-pulley *FP* and the clutch-shaft *cs*. By means of the fan-clutches *FC* either or both fans can be connected to the clutch-shaft *cs*. The north fan is marked *NF*, and the south fan is marked *SF*. Each fan is 110 inches diameter. By this arrangement the north engine can be set to drive either the north fan or the south fan, and the south engine can also be set to drive either fan, or either engine can drive both fans, or both engines can drive either or both fans. One engine and one fan are amply sufficient for changing the air throughout the hospital seven times an hour, with the expenditure of $5\frac{1}{4}$ i.h.p., or at the rate of about 1.07 i.h.p. per million cubic feet of air.

In summer-time, should ten changes of air per hour be required, both fans are set to work, with an expenditure of $10\frac{1}{4}$ i.h.p., or 1.45 h.p. per million. These figures are, as I have already said, the lowest which have yet come before my notice; and, as previously stated, this power is supplied at practically no additional cost to what would necessarily be incurred to secure a continuous hot-water supply.

The north fan-shaft *NFS* and the south fan-shaft *SFS* revolve in bearings which are bolted to the girders *G*. These girders are movable, so that should either of the fans ever require to be taken out the removal can be easily accomplished, the doorways *DD* being made sufficiently large to allow of the fans being taken through them. [See fig. 12.]

The north air-duct *NAD* and the south air-duct *SAD* converge to the main air-duct *MAD*. The air-door *AD* is hinged at *H*, and can be swung into either of the positions shown, so as to shut off the fan which is not working and allow of a clear passage for the air from the fan which is working. When both fans are working the air-door is placed in the position shown by the dotted lines. The pulley *P2* fixed on the clutch-shaft *cs* drives a line-shaft, marked *LS*, and from which is driven the circulating pump for the hot-water supply to be described later on. Fig. 12 shows one of the fans and one of the removable girders.

The external air on its way to the fan enters the heating chamber through openings in the outer wall. The entering air first encounters a series of vertical pipes, kept heated by

FIG. 10.

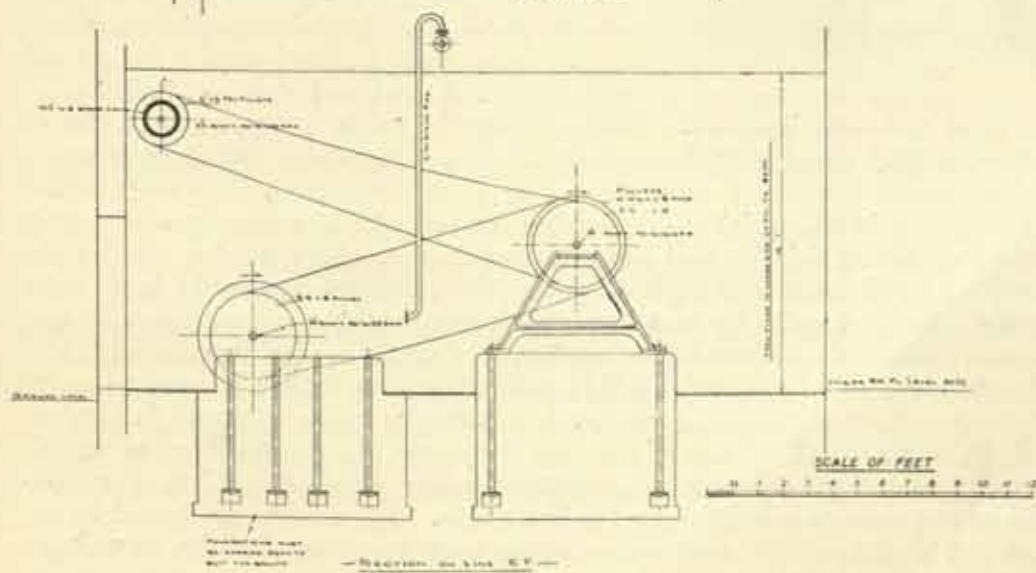
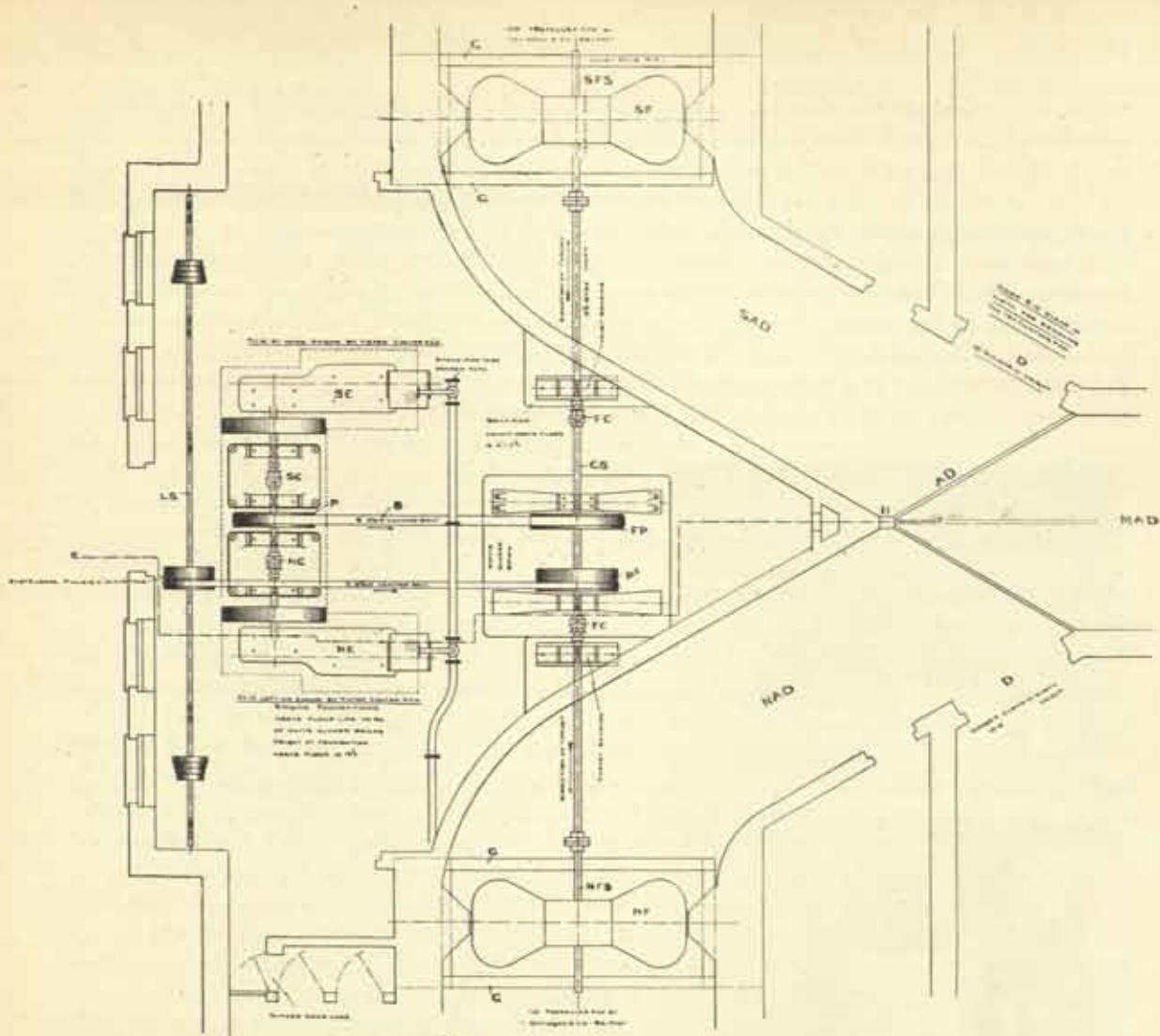


FIG. 11.

steam. These pipes rise from hollow base-boxes, which are supplied with steam through suitable pipes. Each base-box has a longitudinal division cast in it, so that the steam which enters one side of the box is compelled to rise up one vertical leg of the outer coils and to descend in the other leg before it arrives at the outlet side of the base-box. The condense-water is drawn off through drain-pipes and steam-traps connected to both sides of each base-box. The air, slightly warmed by the outer coils, next passes through the cleansing screens. These consist of timber framing, the vertical portions of which are strengthened by being bolted to tee-irons. The horizontal portions are removable, and each panel comprises two strong wooden rollers, one at the top and the other at the bottom of the panel. Coconut fibre in the form of a yarn is wound from one roller to the other, over and under, and the fibres are stitched together close to each roller to prevent them from moving. The two ends of

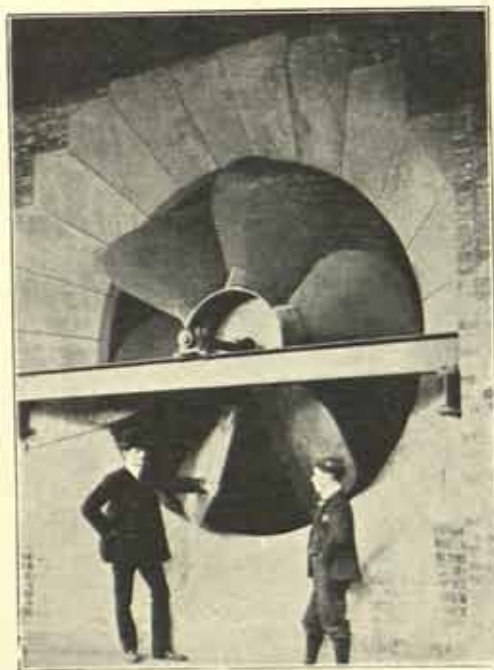


FIG. 12.

the upper roller rest on two chocks on two of the uprights, and the two ends of the lower rollers are then sprung underneath two similar chocks on the same uprights, so that the fibre of the screen thus formed is held in tension. In former installations of this kind the screens consisted of continuous yarns extending from the top of the screen to the bottom; but it was found that in course of time the upper portions of the screens became rotten and gave way, when the whole of the vertical length fell to the ground, and had to be renewed long before the lower portions had become unusable. By dividing the screens up into panels, and by making them in the manner already described, it is quite easy for the attendants to make up a few from time to time and keep them in stock, and the operation of taking out an old panel and putting in a new one is the work of a few minutes only.

The cleansing screens are kept continuously wet by means of horizontal perforated sprinkler-pipes. These pipes are fixed outside the screens, near the tops of them, and about 12 inches away from them in a horizontal direction. They are supplied with water from a series of automatic flushing tanks, similar to those commonly used in lavatories, and each is set to discharge the requisite quantity of water about once every ten minutes. The water issuing from the perforations in the sprinkler-pipes strikes the tops of the screens and runs down the yarns to the bottom, thus keeping them thoroughly wet. After passing through the cleansing screens the air encounters the inner steam-coils, which are constructed in the same manner as the outer ones, and differ from them only in the number employed and in the fact that the steam passes from one base-box to another, so that the vertical legs are all heated in series by the same current of steam. This arrangement was devised in order to get rid of the very large number of regulating steam-valves which had been employed in previous installations, in some of which the valves may be counted by dozens, whereas in the author's arrangement there are only two regulating valves for each heating chamber—namely, one for the outer coils and one for the inner coils. These valves are placed in the engine-room, and by their use the attendant can adjust the temperature of the air with the greatest facility, being guided by the indications of a large scale thermometer, the bulb of

which projects into the fan-chamber, while the scale is visible in the engine-room. The object of the outer coils is to prevent the cleansing screens from freezing in very cold weather, the inner coils being used for raising the air to the required temperature after it has been cleansed by passing through the washing screens. The base-boxes of the inner coils rest upon strong wooden framing, the top of which is covered with 3-inch planks. The vertical spaces are closed by means of wooden louver doors, which can be opened to allow cold air to pass direct underneath the inner coils on the way to the fan-chamber, should it be necessary to make a sudden reduction in the temperature of the air being supplied to the hospital. The occasions, however, on which this requires to be done occur very seldom. The condense-water drain-pipes from the base-box of the inner coils deliver into one condense-water-pipe main, which is led to a large cast-iron tank in a basement chamber near the boilers, which chamber also contains the duplicate boiler feed-pumps by which the condense-water is pumped back into the boilers hot and pure.

The surplus water from the cleansing screens falls upon the floor of the screen-chamber, which is laid to fall, as shown in the front and side elevations of the coils, and the foul water runs away to the main drain, special provision being made to prevent the possibility of drain-air being drawn into the air-chamber.

The function of the outer and inner steam-coils in the heating chambers just described is to raise the whole of the fresh air which enters the hospital to a temperature of about 58° F., which is a suitable temperature for the entrance-hall and the corridors. For the wards the temperature has to be raised to about 62° F., and occasionally for the operating-rooms to about 70° F. Supplementary steam-coils in the branch air-ducts are provided for this purpose. A winter steam-main, conveying steam from the boilers, runs along the whole length of the main air-duct. This pipe is not covered with non-conducting composition, because it is never used excepting when the temperature of the air requires to be raised in the main air-duct; and by leaving this pipe bare the heat from it contributes to the warmth in the main air-duct, to the extent, approximately, of compensating for the loss of temperature in passing along the air-duct. There is another steam-pipe, which is in constant use all the year round. This pipe runs along the pipe-duct, and is clothed with non-conducting covering. Underneath it runs the condense-water drain-pipe for returning the condense-water from the supplementary coils, to be described, back to the condense-water tank. The supplementary coils consist of vertical pipes connected to a base-box, as already described for the main coils. All the air that enters the branch duct has to pass across this supplementary coil. A branch steam-pipe conveys steam from the main pipe to the supplementary coil, and also feeds a $\frac{3}{4}$ -inch wrought-iron steam-pipe, running the whole length of the branch air-duct, and returning at a slightly lower level. The condense-water from this pipe is conveyed to the condense drain-pipe, which runs along the whole length of the pipe-duct, and conveys the condense-water to the condense-water cistern already described. Other supplementary coils still further raise the temperature of the air going into the operating-rooms, and are under the control of those members of the staff who are using the rooms, the handles of the regulating valves being extended upwards so as to be adjustable from the operating-rooms. It was necessary to have a separate regulation for each branch air-duct, and therefore it was impracticable to effect this regulation from a central position such as the engine-house. As the main air-duct is 20 feet high where the air enters it, and as the winter steam-main runs very near the ceiling of the duct, a special form of regulating valve was designed by the author for the purpose. From the two ends of each valve lever depends a light chain hanging down in a loop to within easy reach from the floor of the main air-duct. A cast-iron quadrant, painted black with white figures upon it, is clipped to the steam-pipe, and when the end of the valve-lever, also painted white, nearest to this quadrant points to any number on the quadrant,

that number shows how many of the small holes in the valve-seat are uncovered to allow steam to pass. The admission of steam is therefore exactly proportioned to the position of the lever, and the quadrants themselves, being so large, are easily read from the floor of the main air-duct when the latter is moderately illuminated by means of the electric lamps provided for the purpose, or by means of the light from a hand-lantern directed on to the quadrant.

II. HOT-WATER SUPPLY.

A line shaft drives a rotary pump, which is used for accelerating the circulation of hot water throughout the entire hospital. It is introduced between the return-pipe in the engine room and the flow-pipe. Soon after leaving the pump the water passes through two calorifiers, of which the lower one heats the water by means of the exhaust steam from the steam-engines, and the upper one adds whatever supplementary heat is required by means of live steam direct from the boiler. The live steam calorifier has an automatic arrangement whereby the temperature of the water controls the admission of steam. The maximum temperature proposed to be allowed is about 160° F. This question of maximum temperature is a very important one, because upon it depends the durability of the hot-water taps throughout the building. Taps which work very satisfactorily at 160° are found to give an excessive amount of trouble if the temperature of the water is allowed to attain 200° and 212° F. There are two thermometers in the engine-room, namely, one on the flow-pipe and one on the return-pipe, so that the engine-room attendant can see at any time what the temperature of the circulating water is; and, there being no other means of heating the water besides the two calorifiers in the engine-room, the whole system is under easy central control.

The supply of cold water is brought from the cold-water cistern in the roof of the east wing, and is connected to the return-pipe, so that the cold water, after passing through the rotary pump, enters and is heated by the two steam calorifiers before it passes to the various portions of the building. There are stop-valves on the various pipes for the purpose of enabling the pump and the calorifiers to be attended to without emptying the circulation mains, and a provision is also made whereby either of the calorifiers may be removed in a comparatively short space of time, and its place taken by a plain pipe. During the time that either calorifier is absent the water continues to be heated by the remaining calorifier. A spare pump is also provided which in a comparatively short time can be put into the place of the acting pump, in the event of repairs being necessary. This arrangement was made in order to save the expense of a duplicate plant, and the complication of valves and pipes which would have been necessary in connection therewith.

The general arrangement of the hot-water circulation includes two hot-water cylinders, each containing 900 gallons of water. To the system of circulation are connected eight subsidiary circulations under the wards block, for the purpose of supplying the baths and lavatories in that block. Other subsidiary circulations are also provided for the ophthalmic block, the extern, and the administrative block.

At every necessary point is provided a tee-piece, containing an American pattern scoop for intercepting a portion of the water flowing through the main and directing it into the subsidiary branch. These scoops, taken in conjunction with the forced circulation produced by the rotary pump, are most important adjuncts, as they make quite sure that a rapid circulation of hot water shall pass through all branch pipes, even when the latter are laid on the same level as the main pipes. From each of these tees, which in the contract were called plumbers' tees, a service pipe is led to a bath or lavatory, as the case may be. The general principle of the whole arrangement is that there shall be a circulation of hot water immediately underneath every point at which hot water is required in a room above, so that when a hot-water tap is opened the water issues hot almost instantly, without waiting for a discharge

of water from a long pipe which has cooled down since it was last used. This arrangement is greatly facilitated by having a lofty basement under the hospital buildings, which, as you have been informed, are only of one story. Looped pipes are used for the purpose of allowing for the expansion and contraction of the mains, the mains themselves being firmly anchored to the walls of the building close to each loop, so that the expansion and contraction take place between each two points of anchorage, the extent of the movement being thus determined so as not to affect injuriously any of the branch pipes. All the hot-water mains and the branch

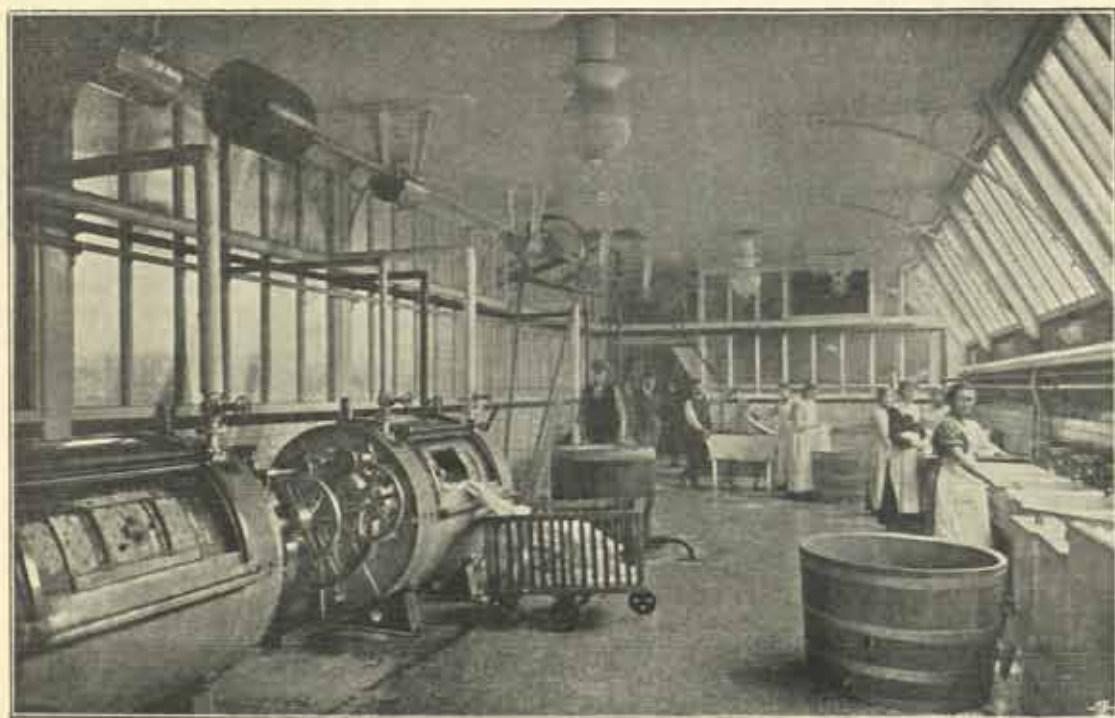


FIG. 12.—THE WASHHOUSE.

circulations are covered with non-conducting composition. The effect of the rotary pump is such that the hot water is caused to circulate through the whole system about once every fifteen minutes, which ensures that the temperature throughout shall be practically uniform, the loss of heat through the coated mains being comparatively small, and amounting only to a few degrees difference between the flow and return pipes in the engine-room.

III. COLD-WATER SUPPLY.

The system of cold-water pipes follows substantially the course of the hot-water pipes, with the exception that no circulation arrangements are provided. Wherever the cold-water mains and pipes are exposed to cold air, as is the case in the open basement underneath the ward block, they are covered with non-conducting composition in the same way as the hot-water pipes, in order to prevent them from suffering from frost.

IV. WATER STERILISERS.

In each of the operating-rooms is an apparatus for sterilising water for surgical purposes. The subject possesses considerable interest, but the author feels that he has already trespassed too far upon the time of the Meeting, and will only mention that the water for these purposes

is first warmed by means of a steam coil, and is then passed through a Berkefeld filter, whereby it has been proved to be absolutely deprived of every kind of microbe, and is thereby rendered innocuous for surgical use. The temperature is regulated with the greatest facility.

V. THE LAUNDRY [fig. 13].

The laundry was carefully designed so that the articles to be cleansed should progress through all the consecutive stages of treatment without being carried over the same ground twice. The ordinary type of machinery is employed. The exhaust steam from the laundry engine is used to heat the drying closet and water for the washhouse. A fan draws air from the ironing room, forces it through the heating coils of the drying closet, and thence into the washhouse, upon the steamy atmosphere of which it has a beneficial effect.

VI. ELECTRIC LIGHTING.

Electricity for lighting the hospital is supplied from the town mains, and is delivered into the hospital on the 3-wire system, at a pressure of 440 volts between the outers. The meters, the main switch, and the distributing boards are placed in a room in the basement. The system of wiring is that which is now well known and generally used, but which the author believes he was the first to use, namely, placing a suitable number of fuse-boxes about the building; using the same-sized sub-mains throughout for supplying the fuse-boxes; using the same-sized fuses in all the fuse-boxes; placing not more than five 60-watt lamps on each fuse for 100 volts, or eight lamps on each fuse for 220 volts; and using the same-sized lamp leads throughout the whole building. The total number of 16-c.p. lamps, or equivalent, installed in the establishment, is about 1,100.

DISCUSSION OF THE FOREGOING PAPERS.

The President, Mr. ASTON WEBB, R.A., F.S.A., in the Chair.

Sir JOHN HOLDER, Bart., said he had been asked—and he rose with great pleasure—to propose a very hearty vote of thanks to Mr. Henman and Mr. Lea for their interesting and instructive descriptions of this unique and novel hospital. It was his privilege to be chairman of the Building Committee of the General Hospital in Birmingham which had been designed and built by Mr. Henman. When they decided to build that hospital they had a limited competition, and they had as their adviser a gentleman whose portrait hung in that room, viz. Mr. Alfred Waterhouse. It had been a great pleasure to him to be connected with Mr. Waterhouse—a more charming man he had never met. That competition took place, and Mr. Henman's plans were far superior to any of the others sent in. They had given him the work, and had every reason to be proud of what he had accomplished in connection with the General Hospital. The building was designed for a system of natural ventilation. After the plans had been accepted, a friend of his—a civil engineer in Birmingham—wrote and asked him to go and see a hospital that was ventilated on Mr. Key's plenum system at Glasgow. As he was very much against the plenum system, he simply

acknowledged the letter and took no more notice of it. Then he received another very strong letter begging him to go and see the hospital. He went, and took Mr. Henman with him; and when he (the speaker) saw the ventilation of the hospital he became a convert to the system. Returning to Birmingham he called a meeting of the committee, and afterwards took up to Glasgow three or four honorary surgeons and physicians and some laymen, and they were even more pleased with the system than he was. What convinced him more than anything else was that the second time he went to Glasgow, on a dark, muggy, rainy day in November, after they had been over the hospital, Mr. Key showed the party over some Board schools, with about 1,200 children, where the system was installed. Generally the atmosphere of such places, with children from a very poor neighbourhood, was most disagreeable, especially on a wet, muggy day. He was, however, greatly struck with the sweetness of the atmosphere of these schools. There was no smell at all, although the children had been there for two or three hours. He asked one of the mistresses if she ever had teacher's headache. No; she used to

have it at her old school, she said, but never at the present one. The master said he liked the ventilation immensely; the only fault he found with it was that between 11 and 12 o'clock in the day he became so hungry that he wanted his lunch! Although they had nothing to complain of in the natural system of ventilation Mr. Henman had provided, they decided to change it for Mr. Key's system of plenum ventilation, and they were very pleased indeed that they had done so. On the coldest days of winter the lowest temperature he could find in any part of the hospital had been 59°, when they had 14° of frost outside. On the hottest days in summer, with the temperature at 84° in the shade, the highest temperature he had found in the hospital was about 68° or 69°. Patients and nurses were breathing fresh air the whole time. If a case of measles or scarlet fever broke out in a ward, they rarely had to close the ward. There was so little contamination; one patient did not breathe emanations from another, and the foul air was carried straight away. Before the Birmingham hospital was built the Johns Hopkins Hospital in Baltimore was always held up to them as a model. When he was in America he went over the Johns Hopkins Hospital, and, though it was a fine hospital, it was nothing to compare with theirs in Birmingham. He had also gone over the new hospital of the McGill University at Montreal, and the new Presbyterian Hospital in New York—the latter quite a modern building—and he was still more pleased with their own at Birmingham after seeing these. From the time Mr. Henman sent in his competition drawings to the present time there was not a single room, passage, or door altered in the whole main block of the building. The late Sir William McCormack, who visited it, said he had been over hospitals in England, and almost everywhere else in Europe, and he had never seen a finer or a better equipped one than that at Birmingham. The building is on the pavilion plan, heated and ventilated on Mr. Key's system, perfected by Mr. Henman. He was glad to find, however, that Mr. Henman, and Mr. Henry Lea particularly, had gone in for a much better system of heating and ventilation. At the Birmingham Hospital there were four stations for the intake of air and two fans to each place, the fans being driven by electricity. They got electric power at a low rate, but the cost of driving the fans was £600 a year. With only one station at Belfast they were able to economise greatly the upkeep of the heating and ventilating arrangements.

Dr. CHRISTOPHER CHILDS, who was asked by the President to give them his views, said he had not come prepared to speak, and if he did, he was afraid he must strike a discordant note; but a discordant note in a discussion was perhaps rather a necessity. He should like to

have heard a little more from Mr. Henman about the question of inlets and outlets. He did not pretend to be an expert, but he had given what time he could to the study of the plenum system, and was strongly convinced that it was the best method they had for ventilating crowded buildings of any kind. He had, however, come across a great many defects with regard to the position and the relative size and shape of the inlets and outlets; he had not had an opportunity himself, at any rate, of finding out that any principles had been laid down with regard to those details, which were certainly most important, because in the ventilating of a room or building they had not merely to supply a sufficient quantity of proper air, but must distribute that air in such a way that each inmate should have his proper share of unpolluted atmosphere. Those who had had opportunities of studying various systems of plenum ventilation in schools or elsewhere found that there was frequently a distinct want of method; that there were many defects by which the air was either short-circuited in some cases, or distributed to certain parts; while in a considerable amount of cubic space the air was quite stagnant. He hoped Mr. Henman might be able from his large experience, and especially from the experience he had acquired in this new hospital which they all admired so much, to give them some hints as to these details. As a physician, however, he must throw in his discordant note. We all recognised the necessity of having a sufficient quantity of pure air, and it was the custom to gauge the purity of that air by certain phenomena: the amount of carbon dioxide, the amount of organic matter, and also, in addition to that, the proportion of microbes in the atmosphere. They knew that if air which was being respired by human beings contained too much carbon dioxide, or too much organic matter, that air was not to their benefit. These conditions could be gauged by means of the chemist's balance: they could gauge also the number of microbes by bacteriological methods with the aid of the microscope. But there was one quality of air they knew very little about, viz. the quality generally ascribed to what was called "fresh air." Did the plenum system contain that invigorating essence which they recognised as given by fresh air? To his mind that was the one thing wanting in the air provided in hospitals by the plenum system. The benefit derived when they threw open the window in a close room and got the fresh air from outside was no imagination. They saw it illustrated in the effects of exercise; for instance, after riding on a bicycle or a motor. Or, again, if one were in a valley or, on a rather close day, below the brow of a hill, if there were no movement of the air, everything was an effort to one—there was a want of energy, which was supplied the moment one surmounted the brow of the hill

and encountered the breeze. What was the difference? He did not think this had been sufficiently considered in estimating the benefit of ventilation. The difference apparently was due in some way to the movement of air over the body; and one would like to point out that in what they called natural ventilation they asked for 3,000 cubic feet per individual when they were within four walls under a roof, and they were very lucky if they got it. But in the open air on a moderately calm day they had not 3,000, but 300,000 cubic feet passing over the body; and there was some effect that they had not yet gauged, due to this air moving over them. That this was not fanciful was again shown by the wonderful effects produced by the open-air method recently introduced in the treatment of phthisis. It was true that the plenum ventilation did away with draughts and produced a uniform temperature; it was true that they could control the variations of the air. But was that the best thing for the patients? Was not that variation of air from time to time a stimulus to patients which conducted to their welfare? Anyone who had tried the fresh-air treatment, as opposed to the closed-window treatment, would tell them how much more free they had been from colds and catarrh. Consumptive patients, when admitted to the open-air treatment, and even to draughts, felt better than when they were within the closed walls of a room. Before they said absolutely that the plenum system was the best for hospital ventilation, those things ought not to be lost sight of.

Mr. A. SAXON SNELL [F.] said that the subject was of extreme importance, in that the advocates of the plenum ventilation were introducing to the public generally, and to architects, a system which had the great attraction of something novel and something complicated. Those who felt that the plenum system was a huge mistake should do their best to have it well argued out; and he suggested that as the hour was so late the debate should be adjourned to a future occasion.

Mr. H. T. HARE [F.] seconded the proposal to adjourn, as further discussion he thought would be instructive and useful.

THE PRESIDENT said that they had been extremely interested in these papers; the subject must appeal to all architects, and to those who were engaged in the erection of buildings of a large and public character, to which he supposed the plenum ventilation must be confined. If they could arrange for another meeting they would do so; but it was always a little difficult to get the same audience together, and to pick up the threads of a discussion where it had been left. He had been very much interested in the plenum system, and especially in Mr. Henman's novel and bold effort to meet the difficulties which a long extended hospital undoubtedly presented to

many people. They all knew examples of hospitals which were extended to such a length that supervision of them became almost impossible. Mr. Henman's idea of bringing the wards all together on the one floor, and under the easy control of the staff, must be an enormous advantage in hospital planning. The question was whether this plenum system would sufficiently ventilate the wards—that he understood to be the main difficulty—and whether the closing up would allow of their being properly lighted. He had not seen the hospital, but only the photographs shown that evening; and one naturally felt how bold a scheme it was to light these wards from the top. But with regard to the ventilation system, and with regard to what Dr. Childs had said of the advantage of passing through air, the plenum system in a building seemed to him to have the advantage at any rate of passing air over the occupants. One could not, of course, in bed pass through the air, but by the plenum system the air passed over one more rapidly than by any system of heating by radiators or pipes; and one advantage of moving the air under mechanical propulsion was, it enabled them to some extent to control and regulate the amount of air passing in and out of any particular room. As regards the disadvantages of the system, he agreed that the more they could talk the matter over the better, and they would endeavour to have another meeting so as to have it well thrashed out. He was sure they were all pleased to see Mr. Henman among them that evening. He (the President) was with him in the Class of Design at the Architectural Association a great many years ago, and he had often seen him since. He had also had the pleasure of working with Mr. Lea, on and off, for a good many years too; so that they were both old friends of his. He knew they would all join in giving a very hearty vote of thanks to both of them for bringing before the Meeting this very novel and original arrangement. It was what the Institute especially invited people to do; and when anyone was bold enough to attempt anything fresh, if he would be good enough to bring it to the Institute, and explain it, they were under an exceptional debt of gratitude to him for doing it.

Mr. HENMAN said that at that late hour he could do little more than thank the Meeting for the kind reception accorded to his Paper. It was impossible to fully discuss "plenum" ventilation in the time at their disposal; he thought Dr. Childs had not really investigated the actual effect of it on patients in hospital wards: he had expressed fears but given no proof that there was real foundation for them. With "plenum" ventilation efficiently applied, as at the General Hospital, Birmingham, and at the Royal Victoria Hospital, Belfast, the atmosphere of the wards was equally fresh and pure throughout the twenty-four hours of the day and night. That was a severe test,

and was absolutely attained. [Sir JOHN HOLDER: Hear, hear.] In visiting existing hospitals he (Mr. Henman) invariably asked about the ventilation of wards, and found that even in the daytime, with windows open, they were not always so fresh as those to which he had referred. Frequently he had been informed that at night, when the windows could not be so freely opened, the ventilation was bad, and that at times the state of the atmosphere was intolerable. The reason was simple. Writers on hospitals had unfortunately laid it down that 3,000 feet of air per patient per hour sufficed (or, with a cubical capacity of 1,000 feet, a change of air only three times per hour); but with ordinary haphazard methods even that small amount of change only took place when there was ample movement of air outside, and the windows could be open; whereas an absolute and continuous change of air from seven to ten times per hour was secured in the buildings to which reference had been made.

Mr. HENRY LEA, in responding to the vote of thanks, said that if another meeting should be held he should be very pleased to attend, if desired, and to listen to all kinds of criticism that might be offered, and, so far as possible, to answer such criticism after he had heard it.

Mr. Henman sends the following further observations on the subject of plenum ventilation:—Having been favoured with a proof of the report of Dr. Childs' remarks, I have pleasure in confirming his statement that greater care should be exercised in respect to the relative size and position of the air inlets and outlets. Large quantities of air may be blown through without securing ventilation in all parts of a room, whether mechanical or natural means be employed. At the Birmingham Hospital the necessities of the pavilion arrangement of wards prevented such nicety of adjustment as we should have liked; but at Belfast there is a large inlet between every pair of beds alternately on opposite sides of the wards, and an outlet under *every* bed. Our experience is that the air supply is best regulated at the outlets: with inlets ever so large the volume of air passed in is only equal to that which is allowed to pass out; consequently, when air comes in through large openings, draughts are prevented provided the outlets are suitably regulated and well distributed, and every portion of the room will be properly ventilated. Proof of this is that thermometers placed in different parts register the same temperature. Such is rarely the case when any but plenum ventilation is employed. In "sounding a discordant note" I fear Dr. Childs rather missed the mark in connection with what he said about fresh air in the open. People capable of climbing hills, riding cycles and motors,

are not hospital patients, but generally individuals in reasonably good health; yet take any number of such, and you will find few of them will agree as to the quality of air which suits them best or the amount of air movement which is preferred. Then his statement is most reckless "that in the open, on a moderately calm day, they had not 3,000 but 300,000 cubic feet passing over the body" (per hour, I presume he intended to say, because 3,000 feet per hour is the orthodox—but inadequate—supply for within doors). Three hundred thousand feet per hour passing over the body would be at the rate of 83 feet per second, or nearly a mile a minute; only the most robust could stand it; it would be death to most hospital patients. Dr. Childs also misses important points in connection with the open-air treatment. Does he not know that for patients at rest all sorts of contrivances are produced to guard them from the action of winds and draughts; that warm clothing is advised for the same purpose; that in rooms, even with windows fully open, air stagnates more or less in proportion to the want of power of wind outside? Where, then, is the difference between trusting to the power of wind in one case and a mechanical power in another? Why, simply in this, that one is uncertain and intermittent, at times too strong, at other times too weak; but mechanism can be regulated and made to work continuously. Once determine what suitable change of air is required, then it can with ease be secured; it is the same air that is moved, whether by wind or mechanism. A hand-fan is employed frequently in the open; why should not a similar but more powerful mechanism be employed for within doors?

Discussion may clear away some prejudices, but until the opponents of ventilation by mechanical means approach the subject in a scientific manner time is simply wasted when only vague surmises and reckless statements are set forth. As I implied in the introductory remarks of my Paper, the principle has been conceded, and we acknowledge failures have taken place; therefore our object is to show that nevertheless success is attainable, because over six years' experience can be pointed to as proof. The buildings are there, and every week patients pass through the wards as quickly as, if not more quickly than elsewhere, having spent the time of compulsory confinement in comfort, and generally leaving in good health and spirits. I often think of Stephenson's critics regarding the dangers of railway travelling; and when he was asked what would be the effect of a cow getting on the lines his reply was, "It would be a bad thing for the cow." Improvement in details has overcome all early fears in connection with railways; so I believe it will in connection with "plenum" ventilation.

WILLIAM HENMAN.



9, CONDUIT STREET, LONDON, W., 19th Dec. 1903.

CHRONICLE.

Test of an Armoured Concrete Column [p. 48].

MESSRS. W. CUBITT & Co. write:—

With reference to Mr. Dunn's article in the number of the *Institute Journal* for 21st November on the Test of an Armoured Concrete Column, we have been told that several architects are under the impression that the safe load of $1\frac{3}{4}$ tons per square foot mentioned on p. 50 of the *Journal* represents the safe load per square foot for any armoured concrete column.

May we be allowed to point out that the strength of an armoured concrete column varies with the percentage of metal used in the reinforcement? The column tested by Mr. Dunn was reinforced with 414 per cent. of metal in the vertical rods; we frequently use columns reinforced with 2, 3, 4, or more per cent. of metal where greater strength is required. Quite recently we have constructed columns, on the Hennebique patent system of armoured concrete, that carry a safe load of 110 tons per square foot.

Building By-laws Reform.

The Council of the Building By-laws Reform Association have appointed a committee to consider and report on the amendments needed in the existing building by-laws. The committee consists of the following members:—Mr. W. M. Acworth, Lord Robert Cecil, Mr. A. H. Clough, Mr. A. Graham, Mr. W. Henman [F.], Mr. Mark H. Judge, Mr. E. L. Lutyens, Mr. Arthur Newbold, Dr. G. V. Poore, Mr. H. A. Powell, Mr. Lacy W. Ridge [F.], Mr. R. W. Schultz, Mr. J. St-Loe Strachey, Mr. E. D. Till, Mr. Thackeray Turner, Mr. C. Turnor, Mr. H. G. Willink, the Hon. Percy Wyndham, together with the chairman and honorary secretary. For the purpose of securing some relief from the more oppressive of the by-laws now in force in rural districts, the committee is to approach the Local Government Board and endeavour to secure their publishing a new set of model by-laws for these districts, embodying amendments which the committee may suggest to the desired end. District councils are then to be urged to amend existing by-laws accordingly.

The Committee is to prepare draft building by-laws carrying out the recommendations that "the by-laws should lay down principles," and that "each by-law should provide that, unless the principle it enunciates is otherwise given effect to, to the satisfaction of the local authority, it shall be considered to be given effect to if the requirements set out in the schedule to the by-law are complied with."

As soon as practicable the by-laws of urban districts are to be dealt with in like manner.

Members of the Association are requested to inform the By-laws Committee of any cases of hardship under existing by-laws, and they are asked to make the Association known to their friends in order that the number of members may be increased as much as possible before the annual meeting next February.

Dr. Evans's Explorations at Knossos.

At a recent meeting of the Hellenic Society Dr. Arthur Evans gave some account of "The Last Campaign at Knossos." During the past season he had expected that the work would be finished in a month or two, but there were unexpected developments, and he lighted on the remains of outlying buildings adjacent to the palace. These proved to have been structures of an earlier period, and constituted interesting additions to the first discoveries. There were disclosed one or two houses apparently of high officials of the court. On the north-east side of the house there was a characteristic room with a square pillar in the middle. There was also a window in the outer wall, and on the portals was discerned a beautiful fresco of lilies. There was also a spiral column of porphyry or similar material, and close at hand a wall painting of olive or myrtle sprays. At the back he found a columnar chamber, on the floor of which was a quantity of curious pottery which appeared to have been dedicated to sacred purposes. The house itself, with its double colonnade, was a kind of miniature of the palace. On the north-east of the palace there was a sort of royal villa. The side of the hill was tunnelled, and going through the passage he struck upon a stone staircase from which two smaller staircases branched off. More searching investigation disclosed a perfect Minoan house. The main entrance was from a terrace above, and traces of upper stories were discernible. There was a double doorway which led direct into the largest hall of the palace. This system of open halls which might be shut off at will secured coolness in summer and warmth in winter. One of the most remarkable features was a recess containing the remains of a throne—indeed, in these early times there were many of the features which marked a Christian basilica. An elaborate system of lighting had apparently been devised. There were other rooms also with a pillar in the centre. The

roof was made of timber more massive and solid than any now found in the island. Many interesting objects were found in the house, among them vases of a wholly different character from those in the palace itself, and wall paintings of designs like those of the vases. Two of the latter were specially beautiful, with papyrus relief forming good examples of the later palace style. The house itself was built against the rock, and in it there was a system of corridors, light wells, and other arrangements for excluding the damp. There were marked evidences of the careful attention bestowed on sanitation by Minoan builders. During the season pits were sunk, and they came to a lower pavement and a large stepped area. The remains were in a decayed condition, but the line of the outer wall could be made out and the general dimensions clearly ascertained. The stepped area was, it would seem, a primitive theatre, though it was hard to conjecture the character of the performances. Near at hand were very singular miniature frescoes of gaily dressed women. Close by was a building of great complexity of wall, and on the ground were many objects illustrating the local cult of the double axe. A group of fine bronze vessels was also found with a foliated design and reliefs of an Egyptian style not unlike those of Thothmes III. The ornament was of a lotus and papyrus development. On a lower level were vases of an earlier period, which might perhaps be assigned to the third millennium B.C., when Crete was in communication with the Egypt of the twelfth dynasty. This might be termed the middle Minoan period, and the work was of elaborately beautiful design. There was also a deposit of earlier times, which might be called Early Minoan, ranging from the sixth to the eleventh dynasties of Egypt. The ware was incised, and appeared to fit on with late Neolithic work. There was altogether a depth of about 25 feet of deposit at Knossos of different periods. The cists of the earlier period appeared to have been closed, probably after some revolutionary movement. It might be stated with reasonable probability that the latest part of the palace was of the date of 1500 B.C. Many of the objects appeared to be religious emblems, and the goddess and the lions frequently appeared. These were found in what might be presumed to have been a sanctuary disclosing the relics of a shrine. The pottery was like the early work of Melos. The religious character was found on many of the seal impressions on which the goddess and the lions were seen, and snakes held in the hands. It was a surprise to come upon faience figures of women in a strange costume beautifully embroidered. Votive rites with snakes were figured in this faience, which showed the extraordinary perfection of the art of the middle period. There was also a very remarkable faience relief of a wild goat and kids. The great surprise of the excavation was

the discovery of what seemed to have been the central object of the cult, in the form of a marble cross of orthodox Greek shape. Other pre-Christian survivals of this symbol seemed to fit on this Minoan cult. The Italian mission had discovered a smaller palace and sarcophagus, which illustrated the cult of the double axe. The inference was that the kings, like Minos himself, had a sacerdotal character—were priests as well as kings.

Sir James Knowles [F.].

The congratulations of the Institute will be cordially tendered to its distinguished Fellow the new Knight, Sir James Knowles, whom the King a few days ago invested also as Knight Commander of the Royal Victorian Order. Sir James, founder, proprietor, and editor of the *Nineteenth Century*, is seventy-two years of age, and has been a member of the Institute over fifty years, joining as Associate in 1851 and proceeding to the Fellowship in 1876. His work as an architect includes the late Lord Tennyson's Surrey House, Kensington House, the Thatched House Club, the public garden and fountain in Leicester Square, and some churches. He has written a good deal from his earliest years, and originated the Metaphysical Society. In 1870 he succeeded Dean Alford as editor of the *Contemporary Review*. Seven years later he founded the *Nineteenth*, a conspicuous success from its first number, the introductory sonnet being written by the editor's friend and constant companion, Lord Tennyson.

Royal Academy £200 Studentship.

Mr. Lionel Upperton Grace, a Student of the Institute and winner of the Grissell Gold Medal 1902, has been awarded the Royal Academy Gold Medal and £200 Travelling Studentship for a design for a Domed Church.

Reinstatement.

At the meeting of the Council on Monday the 14th inst. Mr. John Frederick Fogerty, B.E., was reinstated as an Associate of the Institute.

The late Charles Fowler [F.].

Mr. Charles Fowler, who died on the 8th inst. aged eighty years, was elected Associate of the Institute in 1851 and Fellow in 1862. Until later years he had been an active worker for the Institute, serving for some years the office of Chairman of the Statutory Board of Examiners, and also as a member of the Council and of various committees. The President made feeling allusion to his death at the General Meeting last Monday, and a resolution was passed that a message of condolence be sent on behalf of the Institute to his family.

Mr. Henry Lovegrove [A.] kindly contributes the following particulars of his career:—

Charles Fowler was a son of the Charles Fowler who was for some years one of the Hon. Secretaries of the Institute, and architect for Hungerford and Covent Garden Markets in London, Exeter Market, and Devon County Lunatic Asylum. After he (the father) had retired from practice he lived at Great Marlow, and was buried near the river.

Mr. Charles Fowler, jun., studied under his father, and was for some time with an eminent architect in Germany. He was a good linguist, especially in German and French, and a most accomplished draughtsman, as some sketches in the Architectural Publication Society's Dictionary will show. After his travels were completed he commenced practice, and gave very able assistance to his friend Sir Digby Wyatt in the designing of Paddington Station and a large building for the Government on the south side of the Thames. In 1854 he was appointed District Surveyor of St. Giles and Bloomsbury in succession to Mr. Geo. Pownall, and in 1871 was promoted to Shore-ditch, which he held for twenty-one years, and resigned on the 7th November 1892. He was for a number of years surveyor to the Portland Estate, where he succeeded Mr. H. Baker, and the new building schemes were planned by him. He was at one time surveyor to the Wax Chandlers' Company and to several estates. As architect he designed several blocks of model dwellings, the Phoenix P. H., Norton Folgate, and the Peacock P. H., Maiden Lane, Izant's Restaurant, Middlesex Music Hall, and a large timber store in the Hackney Road; National Schools, Hoddesdon, Herts; and many business premises, new houses, and alterations. In 1851 he wrote most of the description of the Great Exhibition for Messrs. Cassell's *Illustrated Exhibitor*. He was for years Honorary Secretary of the Foreign Architectural Book Society (a social reading club), and also of the District Surveyors' Association. The latter body he afterwards served as President. A more accomplished architect or kindly gentleman it would be difficult to find. Since 1868, when I first made his acquaintance, I have received from him many acts of kindness and consideration, and am proud to think that of his many old assistants I hold two of his appointments. On his retirement about a year ago he went to live at Abbotsleigh, Farnborough, Hants, where he died.

The late Mr. N. Y. A. Wales [F].

It is with much regret that I have to record the loss of Mr. Nathaniel Young Armstrong Wales [elected *Fellow* 1901], of Dunedin, N.Z., who died on the 3rd November. Mr. Wales was a man of many parts, and filled them all well. As an architect his work was good and without affectation, and many of the larger buildings of Dunedin are his design. His personal character

and disposition were such as to win the regard of all who knew him. Outside his profession he was a leading citizen, and for over forty years he had taken part in forming and helping forward many of the movements incidental to a new and vigorous colony. As far back as 1862 he joined the Volunteers and became colonel of the 1st Battalion of the Otago Rifles; he was also a lieutenant-colonel in the New Zealand Militia. He had been a member of the City Council and Mayor of Dunedin, was a member of the Assembly when the abolition of provinces (in New Zealand) took place in 1872, was a member and afterwards Chairman of the Otago Harbour Board, and held many other offices of perhaps not quite so public a character. In bringing this short notice to a close I will quote the following from the *Otago Daily Times*:—"Mr. Wales will long be remembered by a wide circle of old friends and acquaintances, who will feel that Dunedin is the poorer by the loss of an estimable citizen, and one whose career a younger generation might do worse than try to emulate."

F. DE J. CLERE [F],
Hon. Sec. R.I.B.A. for New Zealand.

MINUTES. IV.

At the Fourth General Meeting (Ordinary) of the Session 1903-1904, held Monday, 14th December 1903, at 8 p.m.—Present: Mr. Aston Webb, R.A., *President*, in the Chair, 38 Fellows (including 9 members of the Council), 47 Associates (including 3 members of the Council), and numerous visitors: the Minutes of the meeting held 30th November [p. 82] were taken as read and signed as correct.

The following Associates attending for the first time since their election were formally admitted by the President and signed the Register—viz. Guy Church, Percy Boothroyd Dannatt, Archibald Lawrence Holder, Ernest Martin Joseph, and Edwin Paul Wheeler.

The President announced the decease of Charles Fowler [*Associate* 1851, *Fellow* 1862], and, having referred to his services to the Institute, moved, and it was thereupon resolved, that the regrets of the Institute be recorded on the Minutes, and that a message of sympathy and condolence be sent to his family.

The decease was also announced of Nathaniel Young Armstrong Wales [*Fellow* 1901], of Dunedin, N.Z., and William Warlow Gwyther [*Fellow* 1880].

PAPERS ON THE ROYAL VICTORIA HOSPITAL, BELFAST: ITS INCEPTION, DESIGN, AND EQUIPMENT having been read by Messrs. William Henman [F.] and Henry Lea, M.Inst.C.E., some remarks were made by Sir John Holder, Dr. Childs, and the President, and a vote of thanks was passed to the authors by acclamation and briefly responded to.

As owing to the lateness of the hour there was no time for discussion of the Papers, a motion for adjournment was made by Mr. A. Saxon Snell [F.] and seconded by Mr. H. T. Hare [F.], and the President promised that a meeting for the purpose should be arranged if possible.

The proceedings then closed, and the Meeting separated at 10.30 p.m.



MODERN DOMESTIC ARCHITECTURE.

By ALFRED E. CORBETT [A.].

Read before the Manchester Society of Architects, 12th November 1903.

SO much has been written and said on the subject of domestic architecture that it is with considerable diffidence that I venture to add one more to the long list of studies of this most fascinating subject.

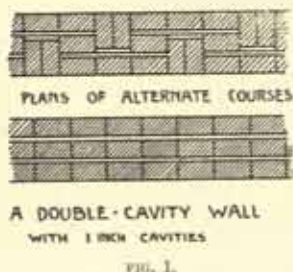
Most architects will agree, I think, that the undoubted advance of late years in the art of architecture has been more marked in domestic work than in any other branch. There are doubtless many reasons for this: one of the chief ones appears to me to be that the design of houses is more directly influenced than that of most buildings by the growing feeling that architecture is *building* before anything else; that while every architect should carefully study the historic styles, and must inevitably be influenced by them to a great extent, modern architecture must be founded more on sound and straightforward construction, and the suitable treatment of materials, than on the forms of the buildings erected to fulfil the requirements of some bygone century. Possibly this view of architecture—the craftsman's view—is less applicable to buildings of a more monumental type; but when applied by an artist to houses of moderate size it results in simple and suitable types of design which are eminently homely and lovable.

Taking this point of view we may usefully begin by considering certain details of construction and materials. Some of the constructive methods I shall mention are unusual, though not actually novel, and it would be very interesting if my mention of them should evoke a discussion as to their value as compared with the more usual methods.

A leading principle of modern hygiene is the avoidance of any inaccessible spaces where microbes or vermin may thrive without fear of disturbance. In nearly all houses there is room for great improvement in this direction, spaces being left under floor-boards, behind skirtings, in sash frames, &c., which are certain to contain dirt if nothing worse. This objection applies in some degree to the cavity in an external wall; but if the wall be well built there seems to be little probability of much harm ensuing, and there is no doubt that the non-conductivity of the air in the cavity makes the house warmer, and damp is excluded better; advantages which generally outweigh the less solid character of the construction. An air-brick may be put behind the kitchen range or other fireplace to ventilate the cavity, the

hot brickwork slightly drying and warming the incoming air. No special outlet is necessary. A cavity wall with two half-brick skins is too flimsy a construction for good work, except perhaps for cottages. In a 16-inch cavity wall it seems better on the whole to put the half-brick skin on the *outside*, though not usual in this district. The greater bulk of the wall is then kept dry, and the floors and roof bear on a solid 9-inch wall. The half-brick outer skin is necessarily built in stretching bond; but this does not seem to be a great drawback as regards appearance, and is certainly better than introducing snap headers for the sake of effect. Some form of wrought-iron tie is probably best for bonding the skins together.

I am indebted to Mr. Edgar Wood for the detail of a double-cavity wall, which appears to have some advantages (see fig. 1). It is really three half-brick walls thoroughly bonded together. Brick headers give more stiffness to a wall than iron ties, but cannot be used in a single-cavity wall unless vitrified, or the ends dipped in tar, as they admit damp. Here, if the damp should get through the headers, it is stopped by the inner cavity; and to get through the wall it would have to percolate through at least 21 inches of brickwork in a zigzag direction, or 30 inches if an additional stretcher be inserted between the headers. This wall is probably warmer than a single-cavity wall owing to the increased temperature and dryness of the air in the inner cavity.



Concrete walls are little used, but in Mr. Sutcliffe's book on House Construction there is a description of an interesting wall of concrete between brick skins, something like the old Roman brick-faced concrete. Half-brick walls are built 6 inches apart, and concrete is run in between them, about two headers to the square yard being inserted to bond into the concrete. I should presume that only about three courses in height could be built at once to avoid the pressure of concrete bulging the green brickwork. By this method the trouble and cost of wood centering is saved, and it is said that in exposed situations in Wales this wall is perfectly water-tight. It is far stronger than a cavity wall, and avoids the somewhat insanitary hollow space. Stone facing could be used in place of brick.

The choice of facing bricks is a most important matter: smooth, hard, pressed, machine-made bricks are utterly unsympathetic; they have no texture, no variety of surface; generally hand-made bricks form a far more beautiful wall, especially if they have some variety of colour. Evenness of colour should never be insisted on. Sometimes with bricks from the same kiln a slight diaper pattern can be made by picking out greyer or redder bricks, or they may be used promiscuously. Thin bricks, 2 inches or $2\frac{1}{2}$ inches thick, with thick joints of grey mortar, make an excellent wall.

Perhaps the best way to make a wall weatherproof is to render it with Portland cement, left plain or rough-cast, either having a very satisfactory appearance. The surface may be enriched with well-modelled ornament of any richness desired. I have seen cottages effectively decorated with simple patterns made by pressing the bowl of a spoon into the wet cement surface, and other equally simple methods may be used.

A good effect, though less durable, can be got more cheaply by giving a brick wall two or three good coats of limewhite mixed with Russian tallow or cow-dung to prevent it from washing off too quickly (as in fig. 6).

Tile-hanging is a very effective protection against weather. The best method of fixing is to nail to Wright's, or other, $1\frac{1}{2}$ -inch fixing blocks, built in alternately with ordinary brick courses to give a $4\frac{1}{2}$ -inch gauge. For nailing into the brick joints one has to use brick-on-

edge to get the required $4\frac{1}{2}$ -inch gauge. The system sometimes adopted for this purpose of building a cavity wall with brick-on-edge outer skin and half-brick inner skin is very flimsy construction; it is much better to build a solid 9-inch wall of brick-on-edge throughout, as the cavity is unnecessary when protected by tile-hanging.

A very beautiful wall-covering can be made with oak or elm weather-boarding or with oak shingles, though perhaps these hardly give the impression of durability, which is so desirable in a building.

Speaking in Lancashire, and within easy reach of Cheshire, about varieties of walling, one naturally refers to half-timber work. The fine old half-timber halls are genuine, straightforward construction, and are very picturesque, leading many architects to introduce half-timber in their new buildings. We must, however, recognise that the bye-laws insist on a 9-inch brick wall behind the half-timber casing, and in these circumstances it seems to be more honest and better construction to show the brick wall than to hide it behind a useless and more or less perishable wood-and-plaster casing.

The walling of, for example, Mr. Prior's cottage at Exmouth is an interesting example of a discriminating mixture of materials, which, when well done, gives wonderful texture and interest to a wall. The other materials of this cottage are worthy of note, *e.g.* the elm weather-boarding and the thatched roof. Thatch is admirable in appearance, and is warm in winter and cool in summer; but the objections to it, especially the risk of fire, are too great to make it a practical roofing material in most cases.

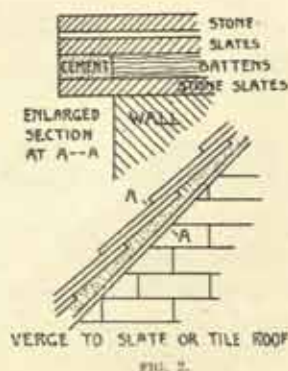
Perhaps the most durable and beautiful roofing material is stone slating, of which a very good quality comes from Brighouse, in Yorkshire. The broken colour, the great thickness, and the delightful surface texture of good stone slates produce a most charming roof. The ridge should be sawn out of solid stone, the only possible alternative being a broad lead ridge. The actual weight of stone slates is something like three times that of good ordinary slates; but there is no need to increase the strength of roof timbers in this proportion; that most important factor, wind pressure, is the same in each case; and also the roof boarding and battens; so that the total pressure on the roof timbers in a roof of 45 degrees pitch is only about 30 per cent. more in a stone-slatted roof than in a roof with ordinary slates, or about 10 per cent. more than in a tiled roof.

Nearly as good a roof—many architects would say quite as good—can be made with rough green slates, such as Westmorlands; the rougher and smaller, in reason, the better they are in appearance. With green slating it is much better, as a rule, to avoid red tile ridges: they form too violent a contrast of colour. Solid stone ridges are excellent; lead is good; and I have seen a greyish-purple half-round ridge tile used satisfactorily.

Some of the grey or purple Welsh slates, though impossible over red brick walls, look quite satisfactory with whitewashed or rough-cast walls, especially if small, thick, rough slates be chosen.

Tiles form an admirable roof if they have a satisfactory texture. Often they are too smooth and shiny, or, as Mr. Ernest Newton once said, "like a piece of boiler plate painted pink!" Good hand-made tiles can often be had of excellent colour and texture. For the ridge a plain half-round tile is the best, and the hips may either have the same or may have the ordinary hip tiles coursing in with the other tiles. Generally any ridge finial is better omitted.

A good verge for either tiled or slated roofs is shown in fig. 2; a single course of slates is bedded solid on the top of the gable wall, and the space between these and the roofing



slates, equal to thickness of battens, is pointed up in cement, giving a strong thick verge with a neat soffit. Tilting the verge up an inch or so improves the appearance and prevents water from dripping on to the wall.

To save cost of lead in cheap work cement flashings are sometimes used. The slates and boarding should bed solid on a ledge of brickwork (fig. 3) to prevent the sagging of rafters from cracking the cement.

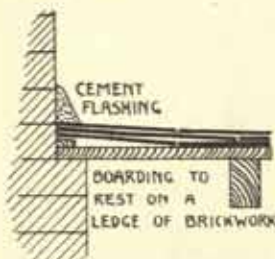


FIG. 3.

It is probably in the construction of floors that there is most room for improvement in ordinary practice, the usual joisted floor being eminently combustible, and providing a large inaccessible space for dirt between ceiling and boards.

For the ground floor a solid concrete floor resting on the ground is rather cold, and it would seem better to retain the usual space between ground and floor. I would suggest a floor of coke-breeze concrete, 5 inches thick, resting on sleeper walls 6 feet apart or less: with this moderate span steelwork could safely be omitted. Wooden centering would be troublesome, but thin corrugated iron resting on the sleeper walls has been suggested by Mr. Ralph Nevill as being amply strong and cheap; before it eventually rusted away the concrete would have matured to its full strength. Ordinary floor boards can be nailed into the coke breeze concrete direct. The usual layer of concrete over the surface of ground could be safely omitted, with adequate ventilation to disperse the ground air, so that the cost should hardly exceed that of an ordinary joisted floor with layer of concrete under.

It is probably not quite so easy to get a good and cheap solid concrete construction for the upper floors. The spans are greater, and the floors would probably have a more intense heat to resist in case of fire. The invaluable record of "Facts on Fire Prevention," issued by the British Fire Prevention Committee, indicates that coke-breeze concrete stands a fire better than ordinary ballast concrete, not being so liable to disintegrate and collapse; and that its resisting power is greatly increased when expanded metal lathing is embedded in the under side. Small-meshed metal lathing, if properly supported, serves as centering, avoiding the cost of wooden centering, affords an excellent key for plastering, and considerably increases the strength. Fig. 4 shows a suggestion for a floor of coke-breeze concrete (six to one), with



SKETCH DETAIL FOR A FLOOR 10'-0" SPAN
TO BE ERECTED WITHOUT WOODEN CENTERING

FIG. 4.

steel joists 3 feet apart and metal lathing hung beneath them by wires; support for the lathing is afforded at two intermediate points by wires laced over the tops of joists and under rods beneath the lathing, to resist the strain caused by stamping down the concrete. I have no experience of the cost of such a floor, but it appears to be a comparatively cheap construction.

The advantages of solid concrete floors are resistance to fire, elimination of inaccessible spaces, and durability from the avoidance of rot. The first two of these may be secured at slightly less cost by a solid wooden floor composed of 7 inches by 2½ inches fir-joists placed side by side and spiked together to distribute the load. A depth of 7 inches suffices for a span of 21 feet. If the floor-boards run parallel with the joists the strength is slightly increased. The Fire Prevention Committee's tests show that this floor may be thoroughly relied on for resistance to fire.

A still cheaper construction, giving some resistance to fire, has wood beams, laid 8 feet

centre to centre, supporting a $2\frac{1}{2}$ inch plank floor, on which the floor boards are nailed. The underside may be lathed and plastered, or may be wrought and exposed.

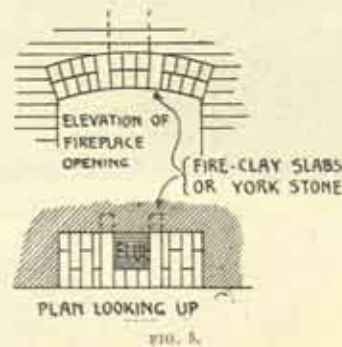
In all cases the resistance to fire is increased by the use of a fireproof plaster.

The objections to joisted floors apply equally to lath-and-plastered partitions. Wire or metal lathing in place of wood laths increases the resistance to fire somewhat, but it is better to have a solid construction, either a half-brick wall, a wall of brick-on-edge in cement, or one of the many slab or solid plaster partitions.

In the staircase resistance to fire is of the greatest value, with a view to providing escape from the upper floors. Treads and strings 2 inches thick of fir, or preferably of oak or teak, will resist a considerable fire, especially with a soffit of metal lathing and fire-resisting plaster.

I have seen a beautiful staircase by Messrs. Ernest George and Peto, made with solid oak steps, which would be absolutely reliable. Stone is untrustworthy in a fire, besides not being so homely in appearance as wood.

Smoking chimneys are sometimes so difficult to remedy that every care should be taken to ensure a good draught. The chief point is to keep the flues warm; put them in internal walls if possible, and have 9 inches of brickwork round them. In external walls, a flue-pipe helps to retain the heat, besides preventing loss of draught by leakage. Eddies from high roofs are fruitful causes of down draught, and stacks must be carried well above the nearest ridge. Flues 9 inches by 9 inches draw better than larger ones, and are enough for all fires except perhaps the kitchen range. The ordinary gathering of brickwork over a fireplace opening gives too great a volume of air over the fire: it is better to make the arch extend the full depth of fireplace (fig. 5), supporting the arch at sides of flue with a strip of York stone, or slab of fire-clay. There are patent fire-clay key-blocks which are perhaps still more effectual, having a wider opening at the bottom.



Without touching on other details of lighting, it may be worth while to repeat, from Leaning's *Specifications*, the suggested scale of electric lights required in ordinary cases.

Bedrooms	.	.	.	.	.	1 c.p. to each 6 square feet.
Dining-room	.	.	.	.	1	" " 4 " "
Drawing-room	.	.	.	.	1	" " 3 " "

The usual incandescent lamp is of 16 c.p., so that a dining-room, 25 feet by 18 feet, would require seven lamps. Frosted glass globes are advisable, as, although they actually obstruct about 10 per cent. of light, they appear to give more light, the less concentrated light not causing the pupil of the eye to contract so much.

My excuse for enlarging so upon the constructive side of our subject must be the conviction that we cannot get real living architecture unless we base it firmly on practical considerations. Of course we need a great deal more than utilitarianism; we need the most inspired imagination, the highest artistic gifts, to create work which shall give a thrill of pleasure to a brother artist; but I would reiterate that the basis must be the best possible solution of the practical requirements, with the most fitting treatment of the materials.

The extremely fascinating subject of the *planning* of houses has been most admirably treated by Professor Kerr in *The English Gentleman's House* and by Mr. J. J. Stevenson in *House Architecture*, but the cardinal principles are ignored in so many plans that I may perhaps be excused a brief survey of some of them, having special reference to rather

small houses, with the proviso that special circumstances may upset any one of these rules sometimes.

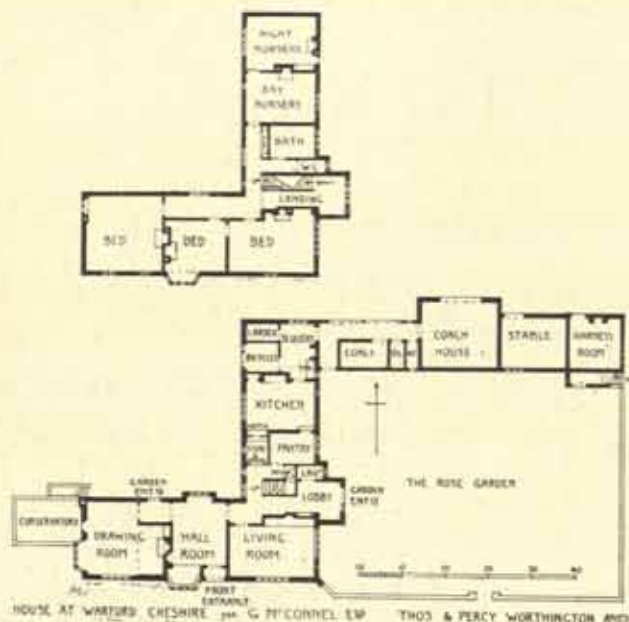
The question of prospect from the windows can hardly be profitably considered in the abstract, but should be most earnestly studied on the site before designing a house, with the



general object of giving to each sitting-room a beautiful prospect, and one which shall be so lit up by the sun as to look its best at the time the room is most used.

Aspect has to be considered chiefly with regard to the admission of sunshine. An ordinary window facing due south admits a gleam of sunshine at about 7.30 A.M., and loses the sun about 4.30 P.M., i.e. it admits sunshine for about nine hours. An east window has its last ray of sunshine about 10.30 A.M.

The dining-room, used in a small house for all meals and often also as a sitting-room, should face south-east or south, getting sunshine until 1.30 or 4.30 P.M. A dining-room facing west would not only be uncomfortably hot for dinner, but the almost level rays of the evening sun would inconveniently dazzle the diners, who could not well move about to avoid the glare. The steeper angle of midday sunshine through a south window prevents it from reaching people's eyes while at table.



HOUSE AT WATFORD, CHESHIRE. DES. G. MC CONNEL. E.M. THOS & PERCY WORTHINGTON AND

FIG. 6.

afternoon and evening, should have a south or west aspect, or preferably both, so as to get two views from its windows. The evening sun is no inconvenience here, as the occupants can move their positions to avoid it. The kitchen and larders should look north, though east is permissible. Obviously these rooms should avoid the sun's heat as much as possible.

The drawing-room,

being chiefly used in the

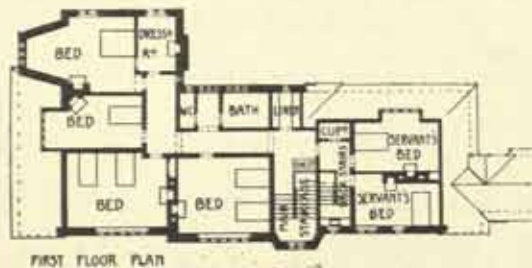
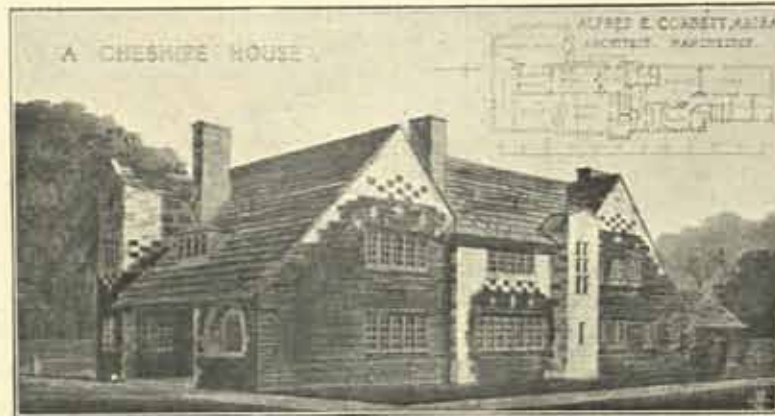
In actual planning it is rarely possible to get every room arranged perfectly, but I will notice a few points which may assist in forming an ideal to aim at in each case.

In sitting-rooms the door is generally best at the further end of the wall at right angles to the wall containing fireplace. In all rooms the hinges of the door should be on side nearest fireplace. Exceptions, of course, occur to every rule.

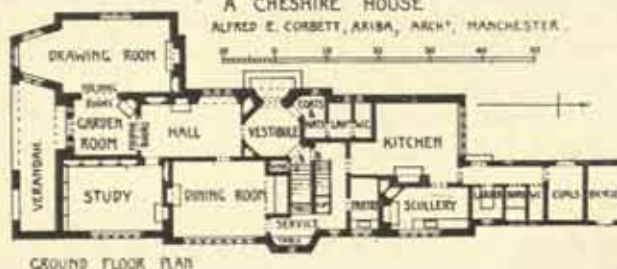
Taking some of the rooms individually, the dining-room, if chiefly used for meals, is perhaps best lighted by a big window, or pair of windows, at one end, ensuring a side light to all the diners, with a smaller window near the other end to give the carver sufficient light. On the other hand, for its use as a sitting-room it is often pleasant to have windows along the side of the room (see fig. 7). One cannot dogmatise as to which is better; each case must be decided on its merits. The serving door should be close to sideboard, and both doors may well be at one end of the room, leaving the other end free from doors and possible draughts. A serving-hatch direct to the dining-room should not be used: it is detrimental to privacy, and requires two servants to work it properly.

In the drawing-room the value of a fine view from the windows is greatest, and this should be obtained, if possible, even at the sacrifice, in exceptional cases, of a sunny aspect, though no effort should be spared to get both aspect and prospect right.

It is often desirable to connect the drawing-room with the morning-room or library by means of folding or sliding doors to make a larger room on special occasions. Folding doors, though they take up a lot of room, are to be preferred on sanitary grounds, as it is difficult to facilitate the cleaning-out of the hollow space required to receive sliding doors. The inconvenient transmission of sound through folding doors may in some cases be overcome by putting a small ante-room between the two rooms: this could be used as a passage to the garden (as in fig. 7).



FIRST FLOOR PLAN



GROUND FLOOR PLAN

FIG. 7.

The third sitting-room may be a study or library, and should have a good place for a writing-table with a left-front light, as shown in Professor Kerr's study plan.

Instead of having three rather cramped sitting-rooms there is a growing tendency in small houses to have one large hall or living room, with plenty of space to move about in, and a small room to receive visitors in, &c. This is an admirable arrangement for an informal seaside or country house. In an interesting small house by Mr. Ernest Newton the large hall, the dining-room, and a small drawing-room are all joined together by wide folding doors. This system of throwing several rooms into one is widely adopted in America, where the general use of powerful heating apparatus appears to encourage an open system of planning.

The ground floor w.c. should be separate, and entered through the lavatory. The lavatory may serve as hat and coat room, but a separate room for hats &c. has the advantage of being accessible while the lavatory is being used.

The kitchen range should be lighted from the left to throw light on to the range without obstruction by the cook's right arm: a right-hand light is not so bad as light from the opposite side of the kitchen, which is intercepted by the cook's body. In some cases a lantern light can be provided throwing light down on to the range, and also providing excellent top ventilation. As the kitchen is generally the servants' sitting-room, it is pleasant to have a boarded floor to most of its area, but there should be a broad tiled or cemented area at the fireplace side leading to the scullery, this being the part most likely to get dirty. The scullery doorway should be as close to the range as possible; the actual door may sometimes be omitted with advantage, leaving a mere opening. It is a mistake to cramp the size of kitchen; in some cases it may usefully be as big as the dining-room or very little less.

Great care must be taken to cut off the kitchen from the rest of the house by a ventilated lobby to prevent the smell of cooking from permeating the house. This may be effected by a serving lobby, giving access from kitchen to dining-room and to hall (or if it give access to the front door without passing through the hall so much the better; see fig. 7), or in small plans the pantry may be effectively used in the same way.

In the scullery a small range or gas-stove is useful. Sometimes the scullery develops into a back kitchen, with a sink, where much of the cooking and all the rougher work can be done, the kitchen then becoming a servants' sitting-room, where some cooking is done occasionally.

The larder must not open direct from the kitchen, the hot air being injurious: it may open from the scullery, but is best approached from a ventilated passage or from the pantry.

There are many opinions as to the best sink for washing glasses &c. in the pantry: a good one is made of 2-inch teak, put together with red lead and brass screws without any lead lining. As the butler or parlourmaid will attend to the front door the pantry should be near it, and its window may usefully overlook the approach.

In bedrooms draughts would probably pass from either door or window to fireplace, and the bed should be clear from them. It is generally advised that the window should be on the left side of the bed, especially where the aspect is east, to avoid the morning sun direct in the sleeper's eyes; but I think there is no great objection to a window at the foot of the bed, light from the right side being worst for most people. In America no bedroom is complete without a large cupboard, often four or five feet square; and I think most of our clients' wives would welcome more cupboards, even though the room had to be proportionately reduced in size.

American plans often contain valuable suggestions, as may be seen in an article by Mr. A. N. Paterson in the R.I.B.A. JOURNAL, Vol. V. [1898], No. 12. One of the plans there illustrated has eleven bedrooms and five bathrooms. Few English clients would agree to such an ample provision, but two bathrooms in a house are greatly to be desired in place of

the usual one. A lead safe under a bath is very unsightly : it is much better to provide a tile or mosaic surface to a concrete floor.

The combination of the various elements of a plan to form an organic whole is a most difficult matter : perfection is rarely possible, and one has to weigh carefully the relative merits of various arrangements to secure the best possible compromise. One has to guard against fixed ideas ; often the plan first thought of embodies some favourite arrangement which one regards as unalterable, or as incapable of improvement ; if alternative schemes be worked out, entirely abandoning this pet device, other possibilities will develop, and very possibly the plan as a whole may gain.

Though the plan is naturally put on paper first, the entire building must grow in the designer's mind as a whole, in plan, elevation, and section, so far as its broad characteristics are concerned ; and particular attention must be paid to the roof, arranging the plan so that it can be roofed naturally and beautifully. The plan should be simple and straightforward, with no waste of space in passages, though some amplitude in the hall and staircase is well worth its cost in giving dignity and comfort.

In designing the elevations the factor of materials is of the greatest importance : the scheme must be mentally realised as a combination of materials of certain colours and textures, not merely as a pleasing arrangement of lines on paper. Local materials generally take their place best as part of the landscape, but the proper preference for them should not prevent the use of *better* materials from elsewhere.

In speaking of materials the subject of terra-cotta is a rather thorny one : it may be a prejudice, but my own feeling is that for country houses terra-cotta should never be used, *i.e.* terra-cotta in the ordinary sense of the term. On the other hand moulded brick may be a useful material, if treated as brick, in small pieces, not in big blocks. I may cite as an example a house by Mr. Lutyens, where the window jambs are of moulded brick, but the transoms and head, for which a material in long lengths is preferable, are of stone ; or another window where the bearing part of the head is of stone surmounted by a course of moulded brick on edge, the mitres at angles being worked in stone, thus utilising the good qualities of both materials.



FIG. 8.—NANNY ROYD, RUDGERSFIELD. MR. EDGAR WOOD, ARCHITECT.

. In illustration of the paper some of the domestic work of the following architects was illustrated by over fifty lantern-slides of plans and views :—Messrs. Balfour and Turner, John Belcher, Reginald Blomfield, Detmar Blow, Goy Dawber, Horace Field, Ernest George and Peto, Hare, Lethaby, Lorimer, Lutyens, Macartney, Ernest Newton, Prior, Ricardo, Norman Shaw, Leonard Stokes, Troup, Allan F. Vigers, Voysey, Edgar Wood, Thos. and Percy Worthington.



9, CONDUIT STREET, LONDON, W., 9th Jan. 1904.

CHRONICLE.

Southwark Bridge.

The following correspondence has passed between the Council of the Institute and the Corporation of the City of London:—

1st December 1903.

SIR,—The Council of the Royal Institute of British Architects, having learned that it has been decided to invite competitive designs for the rebuilding of Southwark Bridge, are most anxious that every encouragement should be afforded to competitors to give the fullest consideration to the architectural quality of the bridge as well as to its engineering necessities. To this end the Council desire to press upon the Corporation the appointment of an eminent architect in association with an eminent engineer, the two to act in collaboration as assessors in the competition, and that it be made a condition that an architect and an engineer should be associated in the execution of the work.

We are to point out that such a practice obtains largely in France, and that the great majority of the bridges in the City of Paris are admired for their suitability of purpose and artistic qualities, and reflect credit upon the city and its method of obtaining these results.

The Council are confident that if a similar practice were adopted for the designs of bridges over the Thames a satisfactory result would be obtained and one that would be regarded with favour by all who have the interests of this important matter at heart.

We are, Sir, your obedient servants,

ALEXANDER GRAHAM,
Hon. Secretary.

W. J. LOCKE,
Secretary.

The Town Clerk, Guildhall.

Guildhall, E.C., 22nd December 1903.

SIR,—I have to inform you that the letter of the Council of the Royal Institute of British Architects relative to the reconstruction of Southwark Bridge has been considered by the Bridge House Estates Committee, and they desire me to acquaint you that in proceeding with the matter

they are acting in consultation with the President of your Institute.—I am, Sir,

Your obedient servant,

The Secretary R.I.B.A.

JAMES BELL.

The Architects' Registration Question.

The nature of the business on the paper for last Monday attracted a very full attendance, the Meeting being strictly confined to members. Most of the Presidents of the Allied Societies were present, even from such distant parts as Dublin and Glasgow. There was a good sprinkling, too, of ordinary members from the provinces. The President, before coming to the main business of the evening, took occasion to address a few words of welcome to the country members, and expressed the hope that their London brethren would have many further opportunities of meeting them in that room.

Notice of their intention to submit to the Meeting certain motions had been duly lodged in accordance with By-law 56 by Messrs. G. A. T. Middleton [A.]; Butler Wilson [F.], President of the Leeds and Yorkshire Architectural Society; J. W. Beaumont [F.], President of the Manchester Society of Architects; John Woolfall [F.], President of the Liverpool Architectural Society; Edgar G. C. Down [A.], on behalf of the Cardiff, South Wales, and Monmouthshire Architects' Society; and Herbert Davis [F.], on behalf of the York Architectural Society. The motions were as follows:—

1. That this Institute is in favour of the general principle of the compulsory examination and registration of architects.
2. That a Committee be appointed to consider what steps should be taken to give effect to this principle, and to report thereon to a Special General Meeting before the opening of Parliament.
3. To nominate this Committee.

THE PRESIDENT, after the formal business was concluded, said he had one or two letters of regret for non-attendance. One from Mr. Gotch; one from Mr. Harold Hughes of Bangor, who said he had received a printed letter from the President of the Leeds and Yorkshire Society, asking if he was in favour of statutory registration of architects. He now wrote: "From the point of view of a provincial architect, I feel strongly adverse to the movement. Registration would only give to a number of incompetent architects a position they neither have nor deserve." Mr. John Bilson, of Hull, wrote that he was extremely sorry he could not attend the Institute Meeting to vote against registration, and regretted it the more, "because," he says, "there appears to be a prevalent opinion that provincial architects are more generally in favour of these registration proposals than I believe to be actually the case." Mr. Hadfield, who was also strongly against statutory registration, had written his regret at not being able to come. Sir William Emerson, whose name had been rather largely

circularised in connection with this matter, and who had been quoted as if in favour of such registration, wrote: "I am quite against it, and feel that the best registration is becoming a member of the Royal Institute of British Architects." There had been the same misapprehension with regard to Mr. John Slater; but Mr. Slater was present, and he hoped would speak for himself.

THE PRESIDENT having called on Mr. G. A. T. Middleton [A.] as being first on the notice-paper, Mr. Middleton stated that he was giving way to Mr. Butler Wilson [F.].

MR. BUTLER WILSON said that he proposed, if permitted, to drop the first and to propose the second motion with a little amendment. As President of the Leeds and Yorkshire Architectural Society he begged therefore to move, "That a committee, consisting of the Council of the Royal Institute of British Architects and representatives of the Allied Societies, be appointed to consider what steps shall be taken to give effect to the principle of registration, and to report thereon to a Special General Meeting."

THE PRESIDENT pointed out that this motion differed from any of those on the notice-paper, and ruled that it was not competent to bring it forward except as an amendment to those motions. After some discussion it was arranged that Mr. Middleton should move the first resolution—viz. "That this Institute is in favour of the general principle of the compulsory examination and registration of architects"—and that Mr. Butler Wilson should then bring forward his proposition as an amendment. This having been done,—

MR. BUTLER WILSON said he did not propose to advance any arguments in favour of registration, nor to attempt to snatch a few wavering votes by any persuasive eloquence. Nor was it his intention to take up the time of the Meeting by a lengthy dissertation relative to the present position of the profession; the existing educational provisions; the significance of legal registration; the educational results of registration; the enhanced position of the profession; the disciplinary results which would follow; the higher mental capacity of those entering the profession; the supposed art objections; the impossibility of voluntary efforts achieving equivalent results; the prospect of an Act being obtained; the importance of the Institute taking the lead before it was too late; the benefits to architecture. The time for the discussion of registration as a principle was past. They knew almost by heart all the arguments which had been advanced for and against. The President himself had said in his Address, "These arguments appear to me to remain much the same to-day, on both sides, as they were in 1889." If the opponents of registration were sincere, they must equally have given careful consideration to and made up their minds on this question, so that anything he might say in favour would not affect their decision. They would be as little

interested in listening to his views as he should be in hearing theirs. If the open mind had not been able to come to a decision by means of the mass of argument and discussion which had been going on since the year 1854, it was absurd to think that a serious conclusion could be arrived at during the short time the meeting would occupy. In those circumstances he would respectfully ask that those opposed to the motions would spare the Meeting the infliction of a wearisome reiteration of well-worn views. If his request were disregarded he might, as mover of the motion, take advantage of his right of reply before any vote was taken either upon his motion or upon any amendment. There were, however, as opposed to familiar theories, some very substantial facts upon which he should be deeply interested to learn their views: facts, he thought, which might with much more profit engage their attention, and which he did not see that they could ignore. He reminded the Meeting that it was at the express request of the Institute that the Allied Societies obtained the opinion of their members regarding registration. That request, he assumed, was not an idle, but a serious request. What had been the reply? There were seventeen Allied Societies in the United Kingdom. Fourteen of those had by special resolution declared in favour of registration. That was a circumstance which might well form a subject for discussion. Those fourteen Societies were at present bound together by a common desire. Whether a refusal would but bind them closer together remained to be seen. He had received many letters with regard to the question of registration, and he would quote shortly from two. A Fellow of the Institute, Mr. Leslie Ower, practising in Dundee, wrote that he thought "the time for debating the question on its merits is past; now the closure should be applied and the vote taken to show how parties stand. Should the Institute maintain as heretofore the position of determined obstruction, I for one am willing to join with the other provincial members in cutting the membership *en masse*." The Hon. Secretary of the Northern Architectural Association wrote as follows: "A few weeks ago I was again asked to write to the Royal Institute of British Architects to say that if some steps were not taken soon we shall be unable to retain the opinion that the Institute should take the lead." He would ask the Institute seriously to consider and realise what this combined verdict of the fourteen Allied Societies meant. There had been an attempt to discount the verdict of one Allied Society by a statement that some one hundred of its members abstained from voting, and it was remarked how much they were entitled to respect for declining to come to a hasty decision upon a question which so far had only exercised the minds of the profession for the short space of half a century! One might just as well doubt the

right of the Government of this country to hold power when so large a proportion of the enfranchised abstained from voting. Had that portion of the community ever been applauded or held up to the respect of its fellows? He would come nearer home and ask what proportion of the Institute abstained from voting; for following that line of reasoning the decisions of the Institute had never expressed the wishes of its members. Did the Institute respect those of its members whose participation in its conduct was confined to the payment of their subscriptions? He could imagine certain circumstances—he did not say they existed—under which members who would pay their subscriptions and remain quiescent in some remote corner of the provinces would engender in certain minds not only unbounded respect but absolute affection. This species of respect was easily analysed and assayed. But those who were interested and earnest were, he ventured to think, entitled to what little respect there might be remaining after it had been showered upon the indifferent. To request the Allied Societies to give their verdict, and when, by special resolution, they had done so to turn round and attempt to belittle and almost to question the value of their formal and constitutional actions, would be a proceeding which, if it were indulged in, he would leave others to characterise. There were present that evening presidents or representatives of some twelve Allied Societies, with their honorary secretaries and members supporting them, and amongst them were men whose work they admired and whose judgment they respected. They had journeyed in the aggregate some thousands of miles to attend this meeting, and it might be relied upon that they had not incurred the attendant trouble and expense either to have their constitutional actions discounted or to be wearied by threadbare objections to registration. They had come to reiterate their regular and formal decisions, and to carry back to their respective Societies the answer that would be given to them by the Institute.—The speaker concluded by moving the amendment in the terms above set out.

Mr. G. C. ASHLIN, R.H.A., President of the Royal Institute of the Architects of Ireland, said that after the exhaustive speech the proposer had made he felt inclined merely to second the amendment formally; but there were one or two remarks that he would make before doing so. In the first place he wished to explain that the prominent ideas in their minds in approaching this question were, first of all, that they were supporting a measure that they believed to be for the benefit of Art in the abstract and of the majority of the practising members of the profession; the second was that they, members of the Institute of Ireland—and he was speaking for that Institute—were thoroughly loyal to the R.I.B.A. They fully realised that no successful scheme of Regis-

tration would be carried out unless the vast majority of the profession, of the Institute and the other representative Societies of the profession, were at one. Their hope, therefore, was that if they found that on a *plébiscite* the majority of the practising members of the profession were against them the remedy they looked for was to try to convert that majority by argument into a minority, so that as the ultimate result an overwhelming majority might be obtained. The question had been so fully debated, not only in this room on a former occasion, but in the Presidential Addresses, that he felt he ought not to detain the Meeting, but begged formally to second the amendment.

Mr. J. W. BEAUMONT said that, as President of the Manchester Society of Architects, he wished to support Mr. Butler Wilson's amendment. The Manchester Society of Architects some time ago passed a Resolution in favour of registration if it were taken up by the R.I.B.A. In August last, in order that he might get information for his Presidential Address, he wrote to all the Secretaries of the Allied Societies asking if they would give him information as to whether they had considered and passed any Resolutions upon the circular sent out by the R.I.B.A. Council, or on a Memorandum *re* a Statutory Diploma for Architects which was sent round to the Allied Societies who were asked to give their opinion about it. He received at that time twelve replies from Secretaries of the Allied Societies. Six of them said that their Societies had passed Resolutions in favour of Registration; one Society had not recently discussed the matter, but formerly were much of the opinion of the R.I.B.A. Council; two Societies were divided in opinion; and the remaining three had not discussed the question at all. Since that time he had received communications which led him to the conclusion that, out of the sixteen Allied Societies which had been approached on the subject, thirteen or fourteen—he thought fourteen—had passed Resolutions in favour of Registration. He thought, therefore, that the Council must take into careful consideration the Resolutions passed by the Allied Societies. The Provincial Societies did not, of course, consider that registration would do any good to the present generation of architects; it was not for that that they were trying, but for future generations. The principal point was that of education and compulsory examination. There was no doubt that the obligatory examinations of the R.I.B.A. had been a magnificent thing for the profession, but there was a certain failure in them. Many students entered for and passed the Preliminary and the Intermediate Examinations, but did not appear at all for the Final, which was the principal examination to test whether a man was qualified for the profession or not; and yet these students went on and practised as architects. Under

Registration, however, every architect would be bound to pass the examinations before he could call himself or be dubbed "architect." Surely that was something—it was a title for their students to look forward to. At present, whether it was want of enthusiasm on the part of students, or that they felt an indifference on the subject, they knew that the fact of not passing the R.I.B.A. examinations was no bar to their practising as architects; and that was probably the case with many of the students who failed to come up for the Final Examination. The President had mentioned in his Opening Address that it would be difficult to know whom to include or whom to exclude in the first Registration. His (the speaker's) feeling was that they must be large-minded in the matter. It was no good weeding out names and getting a big opposition against them. If Registration was to be carried, many persons would have to be admitted into their ranks whom probably they should not admit otherwise; but it must be remembered that that was only for a short time—only for the man's lifetime. If the Registration measure had been passed twenty years ago, he believed there would have been very few architects practising in the present day who had not passed all the compulsory examinations. The question, too, was not one only in connection with the R.I.B.A. and its Allied Societies; there were hundreds of architects practising throughout the kingdom who were not members either of the Institute or of the Allied Societies, and those ought to be taken into consideration as well. The information they had got together showed, to his mind certainly, that there was a very large majority, in the provinces especially, in favour of Registration. Whether there would be a majority among members of the R.I.B.A. could be ascertained only by ballot. It would, however, scarcely do for the R.I.B.A. Council to sit still and say, "We do not consider that Registration is good for the profession." If there was this majority amongst the architects of the country, the matter ought to be inquired into by the Council and dealt with by them.

Mr. J. MACVICAR ANDERSON, F.R.S.E., *Past President*, said he had come prepared to deal with the original motion which was printed and circulated, and he had intended to move as an amendment "That the matter be referred to the Council of the Royal Institute of British Architects." Mr. Butler Wilson's amendment he could not possibly accept, because it seemed to him to pre-judge the whole case. The words of that amendment were: "That a committee, consisting of the Council of the Royal Institute of British Architects and representatives of the Allied Societies, be appointed to consider what steps should be taken to give effect to the principle of registration, and to report thereon to a Special General Meeting." That was giving away the whole case. According to that the Committee would have in-

structions to consider what steps were to be taken to give effect to Registration; in other words this would be admitting the whole principle of Registration. As he ventured to take a totally different view and to dissent from all that had been said by the gentlemen who had spoken in favour of the principle of Registration, he could not possibly accept the words of that amendment. If the words "what steps should be taken to give effect" were omitted, and the President and Council were willing to accept it, he should be willing to move as an amendment, "That a committee, consisting of the Council of the Royal Institute of British Architects, representatives of the Royal Institute of British Architects, and representatives of the Allied Societies, be appointed to consider the principle of Registration, and to report thereon to a Special General Meeting."

THE PRESIDENT: Will that meet your views, Mr. Butler Wilson?

Mr. BUTLER WILSON: It will, Sir.

Mr. MACVICAR ANDERSON: Then I venture to move that, Sir, in place of the amendment that has been put before us.—Mr. Macvicar Anderson went on to say that he considered that Registration would be the most fatal thing that the profession or the Institute could adopt, and ruinous in the extreme, for two reasons, to mention nothing else. First of all, the profession would be swamped with a mass of men admittedly unqualified and the very people the promoters of Registration professed their desire to get rid of by their Bill. Secondly, their action would inevitably create a split in the profession of architecture. His own course was perfectly clear—he knew what he would do if Registration were adopted by the Institute, and he believed a very large number of architects in better positions than himself would take the same course. Were these things to be desired in the interests of architecture?

Mr. H. T. HARE [F.], President of the Architectural Association (London), seconded Mr. Anderson's amendment. The course, he said, that Mr. Anderson had proposed was so obviously the right course to take that he was sure it would appeal to the Meeting.

THE PRESIDENT said that the amendment proposed seemed to meet them all, and he would only say, on behalf of the Council of the Institute, that they were so fully alive to the weight of the opinion of the Presidents of the Allied Societies who had been good enough to come to the meeting, that they would not certainly think of ignoring their opinion which they had taken the trouble to lay before them, and that they were quite prepared and willing to go into the whole matter. There was a great deal to be said on both sides of the proposal. The President then put as a substantive motion—viz. "That a committee, consisting of the Council of the Royal Institute of British Architects, and representatives of the Allied Societies, be appointed to consider the

principle of Registration, and to report thereon to a Special General Meeting."

On a show of hands apparently every hand was held up for the motion. But "On the contrary" being called, one hand was raised. The President declared the motion carried, with one dissentient.

The Plumbers' Registration Bill.

The Plumbers' Registration Bill that passed the House of Lords in 1902, but failed, in the hands of a private member, to pass the House of Commons, has the full approval of the Local Government Board.

It provides for the constitution of a Council, composed of fourteen members, nominated by the following bodies:—Three by the Local Government Board; two by the Association of County Councils; two by the Association of Municipal Corporations; two by the National Association of Master Plumbers; two by the National Association of Operative Plumbers; one by the Royal Institute of British Architects; one by the City and Guilds of London Institute; one by the Worshipful Company of Plumbers, to frame a scheme for the registration of plumbers, such scheme to be approved by the Local Government Board and confirmed by Parliament.

The chief object of the Bill is to afford additional safeguards to the public health by encouraging the better training of plumbers, and by enabling persons employing plumbers to select, if they wish to do so, workmen who have given evidence of their qualification to carry out satisfactorily work in connection with sanitation and the public water supply.

The Bill does not contemplate any monopoly, and does not in any way interfere with the rights of non-registered plumbers. It does, however, prohibit such plumbers from representing themselves to be registered.

It is to be particularly noticed that any scheme framed by the Council is subject to the approval of the Local Government Board and confirmation by Parliament. Therefore any scheme to receive such approval and confirmation must necessarily ensure that all trade interests, as well as all public interests, be fully and fairly safeguarded.

The late William Pain [F].

William Pain, who died on 19th of December, in his sixty-seventh year, was a member of the firm of Messrs. Lee & Pain, of 63, Lincoln's Inn Fields. He was elected Associate of the Institute in 1869 and Fellow in 1875. In conjunction with his partners he was largely employed as a rating surveyor, and in dealing with controversial cases arising out of compensation claims, rights to light and air. As surveyors his firm were concerned in the development and laying out of several landed properties in the suburbs of London, including estates at Clapham, Holloway, Isleworth, and Putney. Their architectural work comprised

many country houses, the building of Her Majesty's Opera House, various improvements at the Haymarket Theatre, St. John's Church, Putney, St. Stephen's Church, Wandsworth, and the Lodge of St. Katharine's Hospital in Regent's Park, several school buildings, &c. Mr. Pain served as member of the Council of the Royal Architectural Museum and Westminster School of Art in Tuf-ton Street, and played a leading part in the recent negotiations for the transfer of the museum buildings and the art collection to the Architectural Association.

Proposed Memorial to Mr. Penrose at Athens.

A movement is on foot to set up a memorial to Mr. Penrose at Athens, and a numerous and representative Committee has been formed to raise subscriptions and to give shape to the scheme. On the Committee are the Presidents of the Royal Academy and the Society of Antiquaries, the Master of Magdalene College, Cambridge, and others representative of art and archaeology in this country; Sir Edwin Egerton, British Minister at Athens, Dr. Dörpfeld, of the German Institute at Athens, Professor Goodwin, formerly Director of the American School, M. Homolle, Director of the French School, a representative of the R.I.B.A. (Mr. H. H. Statham), and representatives of the Hellenic Society and of the British School at Athens. A circular has been issued as follows:—

It is felt by many of Mr. Penrose's friends and colleagues that it would be appropriate to establish some memorial of him in Athens, with which city his name has been so closely and honourably connected for upwards of fifty years. It was as the exponent of the Principles of Athenian Architecture that, as long ago as 1851, Mr. Penrose won his first recognition, and the second edition of his famous Monograph, published by the Society of Dilettanti in 1888, still maintains its authority. Mr. Penrose was the first Director of the British School at Athens, he designed the original school building, and he served on the Managing Committee until his death. He was also called in more than once of late years by the Athenian authorities to advise as to the preservation of the Parthenon.

It would seem natural that any such memorial as suggested should be in connection with the British School, either in the form of a separate artistic memorial or of some addition to the buildings of the School which might be associated with his name.

It so happens that at the present moment the need of further accommodation for the School Library is becoming urgent. The existing Library in the Director's house is all but full, and the room is found to be too small for the open meetings of the School. The Managing Committee have therefore been considering the question of completing the original plan of the Students' Hostel by building a large room which shall serve the double purpose of a Library and a Hall for meetings. The Director is strongly of opinion that such a room would add greatly to the efficiency of the School. The books would then be all under one roof, as the special library collected by Mr. Finlay, and generously presented to the School by Mr. W. H. Cooke, is already housed in the Hostel. If this change were made, the space at present occupied by the Library would provide a welcome addition to the Director's quarters, which are at present somewhat cramped, especially in the matter of reception rooms.

It has been suggested to this Committee that if the proposed new Library building were taken as the main object of the Penrose Memorial Fund, the double purpose would be served of helping the School in which Mr. Penrose took so keen an interest, and of permanently associating his name with a building in constant use by successive generations of students. If funds allowed, a bust or portrait of Mr. Penrose might be placed in this building, and in any case a tablet with suitable inscription would mark its memorial character.

Plans have already been made for such a hall, with studies attached, and it is estimated that the building, with library fittings, and the proposed portrait, would cost about 1,200*l*. This sum will suffice to provide for good work at the usual cost of building operations in Athens, and the estimate is based upon figures obtained from the contractor who was employed, with very satisfactory results, in building the existing portion of the Hostel. Some part of the cost can be defrayed out of School funds, and the late Mrs. Sutherland Orr and Mrs. Matthews, sisters of the late Lord Leighton, being desirous to mark their brother's interest in the School by some appropriate gift, generously allowed the sum of 154*l*. 16*s*. 6*d*., which they had placed at the Hon. Treasurer's disposal, to be applied to this purpose. The Committee hope that this scheme will commend itself to those friends and admirers of Mr. Penrose who desire to see his name and work worthily commemorated in Athens, and that in this way the necessary funds may be provided to carry out this important object.

Subscriptions will be received and acknowledged by the Hon. Secretary and Treasurer, Mr. George Macmillan, St. Martin's Street, London, W.C., or may be paid direct to the account of the "Penrose Memorial Fund" at the Covent Garden Branch of the London and County Banking Company, Limited, Henrietta Street, W.C.

Stained Glass at the Abbey.

Referring to the stained glass window in the south transept of Westminster Abbey mentioned in his lecture on Coloured Glass (*ante*, p. 63), Professor Aitchison writes that his criticism was not directed against the present window, but against that removed some time ago. It was, he believes, at the burial of Browning the poet that he was seated opposite the old windows of the south transept. The lecture was based on notes taken during a tour in England, France, and Italy some years ago for the purpose of studying stained glass; and in writing his lecture for the Academy last year, the Professor forgot that the window he objected to had been replaced by the present one.

REVIEWS.

BUILDING SUPERINTENDENCE.

*Building Superintendence. A Manual for Young Architects, Students, and Others interested in Building Operations as carried on at the Present Day. By T. M. Clark, Fellow of the American Institute of Architects. 15th ed. Price 12*s*. 6*d*. 8*s*. Lond. and New York: Macmillan & Co.*

What is a building superintendent? A fairly complete answer to the question is embodied in

an interesting American work on "Building Superintendence" by Mr. T. M. Clark, now revised, rewritten, and electrotyped in a fifteenth edition. At a very early stage in the perusal of this book we are led to speculate as to the standpoint from which the author treats his subject. The realistic dialogue which passes between the superintendent and the wily workmen on his job is written with a suggestion of personal experience. Such large calls, however, are made upon the credulity of the reader that one verges on the disappointing conviction that the author is too imaginative in his pictures of virtue triumphant over the trickery with which it is encompassed.

The building superintendent tells how he superintends the erection of a stone church and a wooden dwelling-house, giving many valuable hints on the best way to do almost everything connected with such buildings in America. In a later chapter we find model specifications and model forms of contract, the treatise closing with a description of steel-frame construction in commercial architecture—not from the clerk of works' point of view this time, but as seen from the inside of an architect's office. Touching the subject of model specifications, the author remarks upon the futility of producing a specification by altering and amending a printed draft. With this we must unreservedly agree. In practice there is much inducement to the procedure, especially when a number of buildings of the same class are erected year after year, calling, as it would seem, for almost identical specifications. No harm is done if the use of the printed draft stops short at the preambles of trades and descriptions of materials and workmanship, making all other matter serve only as reminders; but any attempt to juggle a printed form into an intelligible specification of the varying needs of the sanitary plumber's trade, for instance, is simply inviting trouble with the builder and vexation to all concerned. This is particularly the case if the work in execution has been varied intentionally or surreptitiously from the specification of doubtful meaning. The thought may occur here: Surely, if a specification is written by a competent hand, it matters not whether the start be made on a printed draft or on a clean sheet of paper. True, but herein is the danger: the very existence of the printed draft induces the mistake so often made, in giving the writing of the specification to an inexperienced assistant in the belief that he cannot go wrong with so much of the document already in printed form. The power to write a good specification is a rare gift; artistic ability or the most profound constructional knowledge does not predicate the power to write a specification that shall contain every detail necessary to the proper completion of a building, and that throughout shall have but one, an obvious meaning. A printed draft specification must ever be an anachronism, to use one is illogical, and it would seem as unreason-

able for a lawyer to create a testamentary trust on a sixpenny will form as for an architect to expect to produce a good specification on a printed draft. On the whole, the student or young practitioner will be well advised to take a strictly academic interest only in model specifications, whether English or American.

We are inclined to the opinion that the evident popularity of Mr. Clark's book is due to the excellence of the chapters dealing particularly with the duties of the clerk of works, but the author's anxiety to do as much good as possible prompts him to write for the instruction of a wider circle. He avers "that it is often necessary and always desirable that unprofessional persons should be able to direct the operations of mechanics and make contracts for various kinds of work." We must confess that we do not see the necessity, nor do we think that any author, however gifted, could write any one book and succeed in so large an undertaking.

So much progress is made in sanitary science in the course of two decades that it would appear wise to retain the writings thereon in some form more elastic than the permanency suggested by electrotyping, which the book has undergone. It is very quaint to read, in the chapter on wooden dwelling-houses, that "although water supply pipes are now generally planned to run outside the walls in positions where they can be easily reached, iron wastes and ventilation pipes are often best carried up in partitions." The modern clerk of works must read these statements in the light of their own antiquity; should, however, such principles creep, by inadvertence, into a modern specification he should know how to deal with them, pending another revision of this part of the book.

A useful addition to the work under review would be an epitome of the qualifications of a good clerk of works, with a code of ethics for general application. It is not enough that he be master of a trade, a careful observer of the quality of materials and workmanship, able to keep a full and accurate diary, taking notes and main dimensions of variations to be covered up soon after execution, judging rightly in the case of a contract schedule the work in extras to be done as day-work and that which should be properly measured. It is not enough that the clerk of works be clear in his views, exact in his instructions, blessed with a good memory, reading aright the specification and drawings, foreseeing difficulties involving delay if left untackled, and having all details of the work at his finger ends. No! All these qualifications will not make for success if the superintendent treat not the contractor and his foremen with a firm and dignified civility; he must be keenly alive to the weaknesses and susceptibilities of human nature, the while giving no just cause for complaints of vexatious interference with the progress

of the works; accepting not doubtful compliments nor hospitality in any form from forbidden sources, yet working on the best of terms with all honest men. On a building in course of erection the clerk of works is a powerful agent for good or ill; much interest, therefore, attaches to any book that deals with his onerous duties; and it is not surprising that with a very readable literary style, with clear printing on good paper, Mr. T. M. Clark's "Building Superintendence" is still making a strong claim to be read by students of the practical side of building.

SYDNEY B. BEALE.

BUILDING CONSTRUCTION TEXT-BOOK.

Elementary Building Construction and Drawing for Scottish Students. By Charles Gourlay, B.Sc. Price 6s. net. [Blackie & Son, Glasgow.]

As stated by the author in his preface, this book has been prepared in order to supply the Scottish student with an elementary work on building construction and drawing, the subject to which the drawings are specially applicable being the ordinary type of residential tenement common in Glasgow and throughout the greater part of Scotland.

The volume consists of twenty-four admirable plates, drawn for the most part to a large scale, illustrating every part of the building, and some fifty pages of descriptive matter, giving a concise and lucid description of the drawings, which embrace every trade. There is also one section dealing with and illustrating the various methods of bonding brickwork and masonry, and another showing the construction of an iron roof of useful design.

Although the author modestly confines himself to a type of building which hitherto has afforded little scope as a subject for architectural education, and only claims for the book that it may be of assistance to Scottish students, he has succeeded in producing a thoroughly practical elementary text-book which cannot fail to be of great service to the student, not only in enabling him to acquire such knowledge as will be required in constructing a tenement, but such as will be called for in building generally; and if a small glossary were attached which would make intelligible to mere Englishmen such barbaric technical terms as scunchions and dwangs, the book ought to prove very serviceable south of the Tweed likewise.

Sufficient information is given in the letterpress and drawings to enable the student to understand clearly how to construct the several parts of the building, without confusing him by multiplying examples teaching practically the same thing, and in this conciseness lies one of the chief merits.

The book is beautifully printed, and the illustrations, as before stated, are excellently drawn and thoroughly practical and complete, and should prove of great service not only to the embryo architect, but also to those who essay to teach him.

W. G. WILSON.

ALLIED SOCIETIES.

THE NORTHERN ASSOCIATION.

Inaugural Address, 44th Session, 11th Nov. 1903.

By J. WALTON TAYLOR [F.], *President*.

MR. VICE-PRESIDENT AND GENTLEMEN,—We are met to inaugurate the commencement of the 44th Session of the Northern Architectural Association, and I feel it a great honour to be privileged to address you for the first time from the Presidential Chair. I need scarcely say how much I rely upon the cordial support of every individual member, as well as the Council, to make my term of office conducive to the well-being and best interests of the Association.

The thought uppermost in our minds this evening will doubtless be the generous gift of £1,500 (in addition to £50 given a year or two ago) by our old friend Mr. William Glover, F.R.I.B.A., of "Meadowcroft," Windsor, formerly of Newcastle-on-Tyne, a past-President of this Association. Many will remember how, during his term of office as President, he not only encouraged the students by offering substantial prizes, but endeavoured to inspire them with enthusiasm for the profession he loved so well. Several who now hold positions of responsibility owe their success in a great measure to his kindly sympathy and support. Our indebtedness to Mr. Glover is now vastly increased by the deed of gift recently executed by him, and held by trustees for the benefit of the Association, the interest accruing from investments to be devoted to the Library, providing lectures or other educational facilities, and for instituting a Travelling Studentship with medals and prizes, which the Council have suggested should be named after the donor. Of this sum, £500 has been set apart by Mr. Glover as a nucleus for a permanent building of our own, and a representative committee has been appointed to further the scheme and obtain donations for its fulfilment. It is therefore fitting that, at our first meeting, we should give expression to our deep obligation to our good friend Mr. Glover, and publicly acknowledge his munificent gift. It is also sincerely to be hoped that the younger generation of architects will avail themselves of these advantages to the fullest extent, and endeavour to realise Mr. Glover's aspirations for the city of his adoption.

It has been hinted by some of the senior members that the main object for which the Association was formed, in 1858, has been somewhat lost sight of in the special efforts which have been made to interest and assist the younger members. Now let me remind you that "the Association was formed to promote union amongst its members, the elevation of the profession of

architecture, the establishment of uniformity of practice, and the general advancement of the art and science of architecture." I venture to think you will agree with me that, if an Association is to be successful, its activities must not be too much confined to one section only, but must be representative of all its various interests and agencies; and I also am of opinion that, even if more attention has been given to the younger members of late years than formerly, the result will prove the wisdom of the course taken. Those who have attended the outdoor excursions in summer and lectures in winter, must have been cheered by the large number of students and young men who were present. There has, however, of late years, been a falling off in the attendance of the pioneers. I know how difficult it is for those in active practice to spare time to keep so many engagements in this very busy age, whilst those who have borne the burden and heat of the day may reasonably expect to be permitted to enjoy their well-earned leisure; but I think we should bear in mind how much others may be helped by our presence and influence. I therefore appeal to my older brethren to support the Council and myself in our honest endeavour to further the interests of every department of our work, for the seniors as well as the students, and make the Association a greater means of usefulness than it has ever been before.

EDUCATION OF ARCHITECTS.

This year the Council of the Royal Institute of British Architects made a departure which, to my mind, is of the greatest importance to our profession. At the invitation of the President (Mr. Aston Webb, R.A.) the Presidents of the Allied Societies were invited to attend a conference at the Institute rooms in London, to discuss the education of architects and the Registration Bill. Nine or ten of the Societies (including the Northern Architectural Association) were represented, and each provincial President was afforded an opportunity of stating what educational facilities were offered to students in his particular district, and also the views held by his Society with regard to registration. With regard to Northumberland and Durham, I described the classes in Architecture and Design at the College of Science conducted by Mr. R. P. S. Twizell, A.R.I.B.A., and the various classes held at the Rutherford College. The opportunities for study varied considerably; the larger centres, such as Glasgow, Birmingham, Liverpool, Manchester, and Leeds, being well supplied with Technical and Art classes, similar to what obtains in Newcastle, but they are still far behind the King's College, London University, and the Architectural Association in London.

Mr. Henry T. Hare, F.R.I.B.A., the President of the Architectural Association, gave some very useful information regarding the working of that

institution. Mr. Hare has since then favoured me with some additional particulars, and as these are very interesting, I take the liberty of quoting a few extracts:—

The Architectural Association, London, was established in 1847, by architects in the interests of architectural education. Many of the leading members of the profession are included in its roll of membership, which now numbers over 1,500; of these some 230 are students attending the evening classes and studios. It has been evident that the Schools should be opened during the day as well as in the evening, and in October 1901 arrangements were made to establish a complete day course in addition to the evening classes, the latter being still continued as heretofore. Many architects are of opinion that pupillage should be preceded by some elementary training before entering an office, and a year or two spent at such a School as the Architectural Association would enable a student to acquire at a moderate cost the rudiments of his work before learning the practical details of his profession.

The first year's course includes the following subjects:—

The use of instruments and scales.

Freehand drawing.

Elementary perspective.

Orders of classic architecture.

Elements of the various styles of architecture.

Sketching and measuring details and portions of existing buildings.

Lectures on the History of Architecture, illustrated by visits to buildings and museums.

Elementary construction and materials, illustrated by visits to workshops and buildings in progress.

The fee for this is fifteen guineas per term, there being three terms in the year.

The second year's course is more advanced, and takes in the principles of architectural design and perspective. Students attend this advanced course three days in the week only, the remaining time being spent in an office as pupil. The fee for this course is £10 10s. a term.

As an outcome of this I am hopeful that at no very distant date a Chair for Architecture may be established at the Durham College of Science, Newcastle, which in a large Association such as ours ought to be self-supporting. This will be one of the first subjects to be considered by the Council during the coming Session.

REGISTRATION OF ARCHITECTS.

With regard to the registration of architects, the majority of the Allied Presidents were in favour of it, but thought the Institute was the proper body to take up the subject. They explained very fully the injustice experienced by country practitioners owing to unqualified men posing as architects who had never served their articles or had any special training. These views were most courteously received by the President (Mr. Webb) and other members of the R.I.B.A. Council who were present. They explained the great difficulty there was in reconciling the conflicting opinions of town and provincial members, and until the two sections were agreed it would be unwise to approach Parliament; but they promised the members of conference that the views expressed would be most carefully considered by

the Council. This opportunity for expression of opinion was felt to be most helpful, and a suggestion was made that the conference should become an annual fixture.

THE YEAR'S PROGRESS.

The past year has been one of great activity in the building world. In the northern district some of the large public buildings in Newcastle, notably the new infirmary (Mr. H. Percy Adams, of London, and Messrs. Newcombe and Newcombe, of Newcastle, joint architects) and the Laing Art Gallery (Messrs. Cackett and Burns Dick) are well advanced; whilst St. Chad's Church, Gateshead, and All Saints' Parish Hall, Newcastle (Messrs. Hicks and Charlewood), New Wesleyan Mission Hall in Westgate Hill, Newcastle (Messrs. Crouch and Butler, of Birmingham), and several Board Schools, have been completed. Other buildings, the outcome of private enterprise, such as the "Collingwood Buildings" and "Dial House," Northumberland Street (Messrs. Oliver, Leeson, and Wood); Star Buildings (Messrs. Newcombe and Newcombe) and Messrs. Sopwith's new premises, both in Northumberland Street (Messrs. Cackett and Burns Dick); the Caledonian Insurance Company's offices in Pilgrim Street (Mr. S. D. Robins); Mr. Moffett's buildings in Collingwood Street (Mr. J. Walton Taylor), are finished; whilst the new offices for the Pearl Assurance Company at the corner of Northumberland Street and New Bridge Street (Mr. William Hope); "Emmerson Chambers" in Blakett Street (Mr. B. F. Simpson); the Consett Iron Company's new offices in Pilgrim Street (Mr. C. E. Oliver); Messrs. Deuchar's new premises at the corner of Grey Street and Hood Street (Messrs. W. H. Knowles, of Newcastle, and W. and T. Milburn, of Sunderland, joint architects); Mr. Milburn's new offices, Dean Street, and The Side (Messrs. Oliver, Leeson, and Wood, and Marshall and Tweedy, joint architects), are making rapid progress.

There is every indication of a falling off in the erection of large undertakings, whilst speculative building is practically at a standstill. The outlook for architects is, therefore, not nearly so bright as it has been of late years. We must, however, not take a dismal view of things, but hope that the slackness is but temporary.

RECONSTRUCTION OF NORTHERN TOWNS.

Of late, frequent reference has been made in the local press to the great changes which are taking place in the appearance of the large northern towns; the old landmarks are being removed, and in their places palatial buildings erected in the principal thoroughfares. It is pleasing to note that in nearly every instance these have been designed by members of our Association, and I think both in design and general adaptability they

will compare favourably with similar structures in other large provincial cities. I am afraid, however, that strangers passing through Newcastle by train see little else than the tops of grimy chimneys, and so obtain a very dismal and incorrect impression of the architecture of our city.

It is interesting to compare the old maps of Newcastle, prepared by Mr. Oliver (father of the late Mr. Thomas Oliver, F.R.I.B.A.), with the most recent surveys. We then realise what a vast development has taken place not only in the centre of the city but notably in the suburbs.

Pleasure gardens and country walks of the olden time are now covered with street after street of houses, so that the neighbouring villages are practically part of Newcastle. Should the extension of the city boundaries be carried out by the incorporation of the urban districts of Benwell and Fenham, Gosforth and Walker, and the parishes of Longbenton, Kenton, and Fawdon, the municipal area will be increased by 11,624 acres, and make the total area of Newcastle city 16,979 acres. The increase of population, taken from the returns of last census, will be 56,424, and with the proposed extension Newcastle will then possess 278,665 inhabitants.

The greatest transition in Newcastle took place about seventy years ago, when the late Mr. Grainger secured Anderson Place and grounds, the Nuns' Gardens and fields, and had the ground cleared and laid out into wide thoroughfares, which entirely transformed the appearance of the city and diverted the trend of business. I have in my possession a plan and isometrical view, prepared by Mr. T. Sopwith in 1834, which shows the original scheme, which I have brought for your inspection. I also quote from the plan a description of the proposed new streets and market:—

1. The principal street commences at the head of Dean Street and stretches northward to Blackett Street, which it enters in front of St. James's Chapel. This street will be 80 feet wide, the houses will be built with architectural elevations richly ornamented, and the whole of polished stone, and the carriageway will be macadamised.

2. Another leading street commences near the head of the principal street, where it joins Blackett Street, and extends into the Bigg Market where the Turk's Head Yard now is. This street will be 70 feet wide, and, like those of the principal street, the houses will be of polished stone.

3. A third street commences in Pilgrim Street a little below the entrance to Anderson Place, is continued across the principal street and terminates in the street No. 2. This street, like the preceding, will be 70 feet wide, and the houses also of polished stone.

4, 5, and 6. Three other streets, each 50 feet wide, and with houses of a character similar to those in the streets already described, commence in Pilgrim Street, one below Anderson Place and two above, and will terminate in the principal street.

7. A seventh street commences in the centre of the south side of Eldon Square, and extends into Newgate Street at a point between the Newcastle and Carlisle Railway Company's office and Mr. Joseph Clark's shop.

The new market will occupy an area of nearly two acres,

bounded to the eastward by the street No. 2, and to the westward by the street No. 7. The north and south boundaries are formed by two streets, each 50 feet wide (8 and 9), which commence in the Bigg Market Street No. 2 and terminate in that which commences in the centre of Eldon Square No. 7. Its distance from the present market will not exceed 170 yards.

The market will contain 278 shops, exclusive of the vegetable and poultry stalls, the whole under well-lighted and well-ventilated roofs, and with eight commodious entrances from the principal streets already described.

You will notice how closely the first ideas have been adhered to. These consisted of a street, 80 feet wide, in continuation of Dean Street, parallel with Pilgrim Street (then the main street), which he named New Dean Street (now Grey Street); another new street, 70 feet wide (Grainger Street), connected Bigg Market with Blackett Street at the top of New Dean Street. Another street, 50 feet wide (Clayton Street), was projected to connect Newgate Street and Blackett Street, and ran parallel with Grainger Street. Various cross streets are shown at right angles to the main thoroughfares, giving readiness of access. These are known as Hood Street, Market Street, and Shakespeare Street, connecting New Dean Street and Pilgrim Street, and Nelson and Nun Street uniting Grainger Street with Clayton Street. To enable Mr. Grainger to carry out these proposals it was necessary to cut through the old market, situate between Pilgrim Street and the Cloth Market. In lieu of this he suggested an excellent site for the new markets, facing into Grainger Street, and extending right back to Clayton Street, with the new cross streets, Nun Street and Nelson Street, 50 feet wide, on each side. The old theatre, which stood in Drury Lane, was intended to be rebuilt on the west side of New Dean Street (at present occupied by the Turk's Head Hotel); but eventually the site was changed to the opposite side of the street, a proposed cross street was omitted, and the entire space between Market Street and Shakespeare Street was utilised for buildings. In the formation of Grainger Street it was found necessary to cut through the Nag's Head and Turk's Head public-houses, and he provided a site for the new Turk's Head in Grainger Street (now occupied by the Grainger Hotel); but eventually the site at first intended for the Theatre Royal, in New Dean Street, was adopted for this building. You will notice that at this date Grainger Street West was not contemplated, and the only means of communication with Neville Street and the New Grainger Street was by means of St. John's Lane. This at a later date was cut through, and the present handsome approach from the Central Station formed, which has taken the place of Pilgrim Street in the olden times, and later of Grey Street, and become the principal business thoroughfare of the city. Blackett Street and Eldon Square were already in existence, and no

doubt the erection of these dwellings had suggested to Mr. Grainger the idea for further development.

Although a great deal of the credit for the initiation of this vast improvement is undoubtedly due to Mr. Richard Grainger and his legal adviser Mr. John Clayton, yet we should not overlook the important part which our first President, Mr. John Dobson, Messrs. John and Benjamin Green, Mr. John Wardle, Mr. George Walker, and others, took in the designing of the handsome street frontages which are the admiration of all visitors to the northern metropolis. I think it is very much to be regretted there has been so little recognition of these pioneers of architecture, and something should be done by our Association to keep their names green in the memory of younger Newcastle. Whether it will be possible in the near future to realise Mr. Glover's cherished wish of securing a permanent home, it is difficult to say. If that were done, it would be very desirable to have an exhibition of the works carried out by them, and thus form a museum of art similar to the Royal Institute of British Architects; but, failing that, it may perhaps be within the range of possibility for our Vice-President (Mr. J. T. Cackett) and the Treasurer (Mr. R. Burns Dick) to secure from the Library Committee of the Corporation a corner in the New Laing Art Gallery, which they recently designed, to be known as the Architectural Section.

DEVELOPMENT OF THE SUBURBS.

Although we may justly be proud of our principal streets, I am afraid the same cannot be said of our northern suburbs. Compare these with Birmingham, Nottingham, Sheffield, Bristol, Cardiff, and other commercial centres, and we realise at once how inferior they are. Architects are often censured for this state of things, and even held responsible for the class of houses which spring up in all directions on the outskirts of all large northern towns. I think it is time we should clear ourselves of this unpleasant stigma. Are we really to blame? If we inquire how it is that in some of the large industrial towns of Great Britain and Ireland there are such fine suburbs, wide streets with avenues of trees, attractive detached houses standing in the midst of well-planted gardens, I think we shall find that in every case the original landowner had the foresight to lay out the roads, plant trees, and was prepared to wait until the demand arose for sites. He laid down stringent building conditions, and restricted the number and class of houses to be erected in a particular district, the result being that the residents were secured against any infringement in the event of the land changing hands. As a contrast to this, see what is taking place in our beautiful suburb of Jesmond!

Where once stood noble mansions with well-timbered grounds, we now have rows of tenement houses or small terrace houses with the inevitable back street, the trees cut down and the aspect of the whole district deteriorated. It is a well-known fact that small sites will yield a larger price and bring in a quicker return than if laid out as villas. Instead of the entire district being in the hands of one public-spirited owner, it has been bought up in sections by syndicates, who compete against each other for the largest return for their investment. It may be said that Newcastle is strictly a commercial and manufacturing town; but what about Birmingham with its beautiful suburb of Edgbaston, or Bristol with Clifton? or, better still, take Cardiff, which is now reaping the benefit of the shrewd, far-seeing late Marquis of Bute, who laid out wide avenues, reserved sites for municipal buildings and parks, whilst the town was in its infancy, and now we see a model borough, with the charming marine watering-place of Penarth within a few minutes' railway journey laid out on similar lines. I cannot help thinking that our public bodies should do something to prevent these self-centred vested interests, and formulate a well-thought-out scheme for the development of all new districts.

Mr. Frank W. Rich, F.R.I.B.A., Past President, in his inaugural address of November 1898, alluded to the small percentage of domestic buildings designed by architects. He very ably defended our profession from the uncomplimentary opinions sometimes expressed with regard to our street architecture, and clearly showed that we were in many instances not responsible for the erection of the ordinary class of dwellings. But where architects were engaged he advocated thoroughness in plan and simplicity of design. With these remarks I thoroughly agree, and would strongly recommend our younger men to study carefully his excellent advice.

THE HOUSING PROBLEM.

One of the most prominent questions in all large centres of population is the housing problem. In the *County Monthly* for March 1903 an article appeared under the title of *The Warrens of the Poor*, being one of a series descriptive of the slumdom of the great provincial cities. The subject chosen for that month is *Vivid Pictures from Newcastle*, wherein the writer describes in graphic language, and illustrates with special photographs and sketches, some of the dismal tenemented properties which are known to many of us in Dog Bank, The Close, the lower part of Pilgrim Street, Sandgate, &c. We cannot shut our eyes to the fact that many of the dwellings in these old courts and chares are unfit for habitation; but unless they are closed by the city authorities, a certain class of people will continue to live in them, not that

they are compelled by poverty to do so, but because they become indifferent to their surroundings, and so herd together. Even if these were closed tomorrow, it is very doubtful whether this class of people would not in many instances remove into another locality which is at present respectable, and so in a short time it would become as bad as those from which they were displaced. This subject has been taken up at different times by philanthropists, budding politicians, faddists, and social reformers; but, so far as I am aware, no society of architects has ever dealt with it in a practical way. I think we may claim to know something of the difficulties, and as we have "no axe to grind," but seek rather to beautify and ennoble the towns and cities in which we live by the exercise of our profession, our attention should be directed to it during the coming session, and this is my only apology for introducing it here. Some of the social reformers have advocated costly schemes for pulling down large areas of slum property, and building in their places palatial blocks of dwellings at the public expense; others have visions of transporting the dwellers of slumland into the suburbs, and forming a colony there, on the model of Bourneville near Birmingham, Saltaire in Yorkshire, or Port Sunlight. Let us look a moment at each of these proposals.

INDUSTRIAL BUILDINGS.

I think we may take it for granted that people of this class do not like the restraint and order inseparable from buildings of this kind. It is imperative that there should be a resident manager who will not only look after the interests of the owners, but see that order is maintained. I am afraid the ordinary inhabitant of the slum does not favour this arrangement, and would rather prefer to live in unsavoury surroundings and have freedom. Then, as to the cost. I think we shall agree that high buildings built with fire-proof materials cannot be erected to conform with the local by-laws and yield a fair return on the capital expended as an investment.

THE REMOVAL INTO THE SUBURBS.

The average workman likes to be within easy reach of his daily labour, and, all things being equal, would prefer to be where he could go home to dinner. The model villages referred to, especially Bourneville and Port Sunlight, are the centres of vast industries where large works have been erected by the employers, who secured sufficient land to provide houses with garden plots. The residents, therefore, only require to be provided with public halls, reading rooms, bowling greens, and other means of recreation, combined with shops for the purchase of the necessities of life, to make them a happy, contented community. We know very well how difficult it is to persuade workmen to leave the towns to work on buildings

in country villages, even in summer amidst beautiful scenery and pleasant surroundings, and when they do consent to go they are constantly longing to get back into the well-lighted streets and variety of town life. In this district, where the principal industries are engineering and ship-building, the works cannot be removed, and the land is too valuable (even if possible) for houses of this class, and it must also be kept in mind that the workmen often have to change from one yard to another to secure regular employment, which they could not so conveniently do if located in the suburbs.

WHAT IS THE SOLUTION?

In my opinion the Corporation of Newcastle are acting wisely in erecting two-storied dwellings in tenements on the line of the electric tram route, so that those who wish to live at a cheap rent can do so, and readily remove from one ship-yard or works to another; besides, the facilities for travelling in workmen's cars are so great that there should not be any difficulty in the men getting quickly to their work in any weather. In fact, the quick and frequent electric tram and train service promises to be the solution to a great extent of the housing problem. For those who will not remove from the slums I would suggest the course adopted by the Borough of Camberwell, as reported in the *Newcastle Daily Chronicle* of 16th April, 1903:

Instead of pulling down the tenements in slum areas and turning out the tenants to find habitations how and where they can, Camberwell has selected the Hollington Street and Sultan Street area lying off Camberwell Road, and containing the population of over 4,000, and is gradually transforming the housing accommodation of the whole. The Borough Council buys the houses not to pull them down, but to improve and adapt them. The purchases are made privately, at reasonable prices, and not at the inflated values customary in the case of compulsory sales. The houses are then transformed into healthy tenements, in some cases without even turning the occupiers out; and not only is the standard of the house accommodation being raised over the whole neighbourhood, but rents are kept low. The experiment has been a striking success, and the scheme being entirely self-supporting has not cost the ratepayers a penny.

PUBLIC OFFICIALS UNDERTAKING PRIVATE WORK.

I now wish to touch briefly upon a matter which leads us upon somewhat delicate ground; that is, the question of officials in Corporation and District Council offices doing architectural work. As this is a subject which affects us very directly and materially, and is likely to affect us more in the future than it has already done, I think it is well to direct attention to it, so that the necessary steps may be taken to bring pressure to bear upon those in authority.

It seems manifestly unfair that we architects should be deprived of an opportunity of earning a livelihood by those already in receipt of regular

salaries, towards which we, as ratepayers, contribute. These gentlemen have no office rent to pay, no stationery to provide; and yet, in some instances, they are allowed to undertake private work. It is a further injustice that the same persons are permitted to report upon their own plans, which is surely a state of affairs entirely out of keeping with things as they ought to be in an elective and governing public body. These are matters which we as an Association will do well to consider carefully, and I leave them with confidence in your hands.

In conclusion I wish to put myself right with my hearers regarding some of the subjects touched upon in this address. I do not for a moment forget that my remarks as President should be representative of the whole of the members comprised within the area of the Northern Architectural Association which includes the counties of Northumberland and Durham. We have also 216 on the membership roll, and I believe I am correct in saying this is the largest number since its inception. If more frequent reference has been made to Newcastle than other towns, I trust my country brethren will not think their interests have been overlooked, as my remarks are intended to apply to the district generally. Newcastle is the home of the Association, is admitted to be the metropolis of the North; my thoughts therefore have naturally dwelt more upon what concerns its past and future development. Some of the other matters referred to may appear of a somewhat personal character; but many of us feel they are of a pressing and vital importance to the well-being of our noble profession, and I should be failing in my duty as your President if I were to miss this opportunity of calling attention to them, with the hope that permanent good may result.

ROYAL INSTITUTE OF IRELAND.

The Annual General Meeting of the Royal Institute of the Architects of Ireland was held at the Institute rooms, Lincoln Place, Dublin, on the 18th December. The President, Mr. George C. Ashlin [F.] addressed the Meeting, and made some observations on the question of Registration. He remarked that when they came to consider the adoption of an obligatory examination for their members in the future, they felt that there was little chance of this being generally submitted to unless it was accompanied by State recognition, as in other professions. On this point, as well as on the general question of the urgency of registration, their views were shared by the Ulster Society of Architects, and therefore, as far as the profession was represented in Ireland, there was practically no difference of opinion. The pronouncement on the subject by the President of the Royal

Institute of British Architects at the opening meeting in London might be taken as embodying everything that could be said against it. His first argument was that Parliament would never grant compulsory registration as long as there is a considerable body of opinion strongly against it, including its leading members. The force of this objection would mainly depend on the numbers on each side, as their legislators could hardly refuse a measure based on the principle already recognised in the case of other professions, if it was supported by a substantial majority of the practising members. The next objection put forward was that it would be a difficult and serious task to decide who should be admitted and who should be excluded; and further, that a good deal of disability as well as ability might be registered in the first instance. This was, of course, true; but precisely the same difficulty existed in the case of other professions, and it had been successfully overcome; moreover, any injurious effect would be exceptional, and would disappear after a few years. In the meantime it would be surely of advantage to separate in even a rough and ready manner, in the words of the President of the Royal Institute of British Architects, "the sheep from the goats." The next objection was that speculative builders, auctioneers, &c., would still continue to design buildings, and that some of them might qualify themselves under a Government diploma and thus make the condition worse than it is. Referring to the first point, this could not, of course, be avoided, but the distinction between a qualified and an unqualified practitioner would remain for the guidance of the public and local representative bodies. With regard to the second point, the necessary training and study to obtain the diploma must result in some benefit to Architecture in the abstract. As to the argument that art should be free and that registration would tend to shackle it, it was hard to understand how this would result. The profession would be open to everybody who qualified himself, and certainly the possession of heaven-born gifts as an artist would not be considered a disability in a candidate. As to saying that painters, sculptors, and engineers did not seek Government diplomas and still their professions were more allied to Architecture than law and medicine: with regard to the first two professions there appeared to him no analogy at all, their works told for themselves from the start and required no hall-mark, whereas the architect ought to have many qualifications which were not so easily appreciated. The last argument which he would refer to was that the Institute Examination offers sufficient inducement to make the lazy ones work, and that, therefore, the diploma is not essential for that purpose. He held exactly the contrary opinion, and it was this consideration that convinced him more than anything else of the urgency of the measure. He assumed, of

course, that the Royal Institute of British Architects would take the leading part in formulating the education scheme as well as in superintending its development, and that the Government action would be as limited as it was in the case of other protective professions.

The Report of the Council for the year 1903 was then read as follows:—

GENTLEMEN,—We have pleasure in laying our Annual Report before you. The year that has almost passed has not been marked by any very great activity in the building trade—possibly the result of the “backwash” of the late war. Your Council, however, have not been idle, and have had under consideration several questions of great professional importance. The revision of the by-laws—a matter which occupied your Professional Practice Committee for many months—was completed late last session, and these by-laws were printed and circulated to our members. We are glad to state that they have been found very complete and satisfactory. As, however, in all finite concerns, perfection is impossible, it has been found advisable to introduce two variations. One of these is very important, and should not be passed over in our report without notice. We refer to the variation in the by-law which governs the election of the Council, and enacts that two members of Council shall retire annually and be ineligible for re-election. The intention of such a by-law is evident. The other alteration, that which reduces the number necessary to form a quorum at a general meeting from ten to seven, was adopted for obvious reasons.

The question of the revision of the Conditions of Contract now generally in use has occupied the attention of the Council and the Professional Practice Committee at frequent meetings during the year. Our members may express surprise that this subject should still remain unsettled—should still crop up each spring as our hardy annual and brave the winters unblasted; but any such surprise can only be expressed by those who have not given the whole question careful study in all its complexities and who do not recognise the vast divergence of opinion held by the members of our profession on the various questions in connection with it. We earnestly hope, however, that some definite decision may be arrived at next session, and that this very difficult question may be settled in a satisfactory and equitable way to all concerned.

At an early stage in the session a deputation was received by the Council from the Architectural Association of Ireland, who, feeling that their effort to improve the educational advantages open to students of architecture in Dublin, by lectures, by classes, and by prizes, lacked the stimulus of a definite aim, proposed that the Institute should enact that for the future an examination should be held by the Institute, in

general education and professional efficiency, and that the passing of such examination should be made a condition precedent to election. This proposal, it will be seen, introduces a radical change in our constitution, and requires the creation of an examining body with considerable machinery for the exercising of its functions. The Council, feeling how much the profession owe to the excellent efforts of the Architectural Association and the educational advantages it offers, have given this question most careful attention. The principle of Qualifying Examinations was adopted at a general meeting held on the 18th of June 1903. Such a radical change as this proposal suggests would, however, have to obtain the consent of the Royal Institute of British Architects, with which body we are allied, and it is not at all evident that they will permit us independently to hold such qualifying examinations. In considering the subject, it must be remembered that, when we have made the passing of an examination a necessary qualification for membership, the letters M.R.I.A.I. after our names will imply something quite different from that which they now do, and that the right to use these letters is tantamount to a diploma of efficiency.

The attention of the Council has been directed to several unsatisfactory conditions of competition issued to the profession during the year by public bodies, and have found it necessary to urge their members to refrain from taking part in these. It is to be regretted that the promoters of such competitions should not recognise what is due to members of an honourable profession, and should issue conditions framed in such an inadequate way as to exclude all self-respecting architects from competing.

A very successful *Conversazione* was held in the rooms of the Royal Hibernian Academy, and we were graciously honoured by the presence of his Excellency the Lord Lieutenant on the occasion. It is hoped that, if vigorously supported by the members, this may become an annual function.

An event claiming record was the most interesting lecture delivered before our members by Mr. Percy Fitzgerald on the work of Robert Adam.

The usual exhibition of the Prize Drawings kindly lent by the Royal Institute of British Architects, was held this year in conjunction with the *Conversazione*, a variation in procedure which we venture to think was acceptable.

The prize presented by our Institute for competition among Members of the Architectural Association of Ireland duly took place, and the assessor, Mr. Batchelor, awarded the prize to the competitor who adopted the up-to-date motto “Sunprint.” On the envelope being opened by the President at our Council Meeting, the name disclosed was that of Mr. Alfred Livesay, of Kildare, whom we heartily congratulate.

The social event of the year was the visit to Dublin of their Most Gracious Majesties the King and Queen. A loyal address was presented by the Council, and received a gracious reply.

Our Honorary Officers, in accordance with the by-laws, having filled their terms of office, retired in November. These posts have been filled by the election of Mr. R. Caulfeild Orpen as Honorary Secretary, and of Mr. Charles H. Ashworth as Honorary Treasurer. The Council would like to place on record their entire appreciation of the splendid service both the out-going officers, Mr. Kaye Parry and Mr. Owen, have rendered to the interests of the Institute. Our roll of membership now reaches a total of 103, and we are glad to be able to state that our Honorary Treasurer reports that our financial state is satisfactory.

We record with regret the death of Mr. Frederick A. Butler, who was a Member of our Institute for twenty years. Although Mr. Butler never actively took part in the affairs of the Institute, we feel that his unimpeachable professional record, and his kindly, unassuming manner, brought honour and respect to the calling he faithfully followed.

The following are the officers and Council for the ensuing year:—*President*, Mr. Geo. C. Ashlin [F.], R.H.A.; *Hon. Sec.*, Mr. R. Caulfeild Orpen; *Hon. Treas.*, Mr. Charles H. Ashworth; *Council*, Sir Thomas Drew, P.R.H.A. [F.], Messrs. W. M. Mitchell [F.], W. Kaye Parry [F.], A. E. Murray [F.], C. A. Owen [F.], G. P. Sheridan [A.], Frederick Batchelor [F.], F. G. Hicks, J. Rawson Carroll [F.], W. J. Gilliland, C. J. MacCarthy, J. J. McDonnell.

MINUTES. V.

At the Fifth General Meeting (Business) of the Session 1903-04, held Monday 4th January 1904, at 8 p.m.—*Present*: Mr. Aston Webb, R.A., *President*, in the Chair, 74 Fellows (including 25 members of the Council), 82 Associates (including 3 members of the Council), and 2 Hon. Associates; the Minutes of the meeting held 14th December 1903 [p. 116] were taken as read and signed as correct.

The following Associates attending for the first time since their election were formally admitted and signed the register—viz. Edgar George Cusson Down (Cardiff), Tom Simpson, and Augustus Edward Hughes.

The Hon. Secretary announced the decease of William Pain, elected *Associate* 1869, *Fellow* 1875, and Walter Simpson McClelland, formerly of Jannagar, Bombay, elected *Fellow* 1891. It was resolved that a message of condolence be sent to the families of the deceased members.

The Hon. Secretary announced the receipt of books presented to the Library, and a vote of thanks was passed to the donors.

The Secretary announced that by a Resolution of the Council under By-law 20 Mr. John Barlow, of Sydney, N.S.W., had ceased to be a member of the Royal Institute.

The following candidates for membership were elected by show of hands under By-law 9:—

AS FELLOWS (5).

PERCY MORLEY HORDER.

ALEXANDER PAUL MACALISTER [A. 1895], Cambridge.

THOMAS RIDLEY MILBURN [A. 1887], Sunderland.

WILLIAM MILBURN, Sunderland.

ARTHUR EDWARD PERKINS.

AS HONORARY ASSOCIATE.

FRANK BERNARD DICKSEE, R.A.

AS HON. CORRESPONDING MEMBER.

LE COMTE ROBERT DE LASTEYRIE, Member of the Institut de France.

Notices being on the agenda from Messrs. G. A. T. Middleton [A.], Butler Wilson [F.], President of the Leeds and Yorkshire Architectural Society; J. W. Beaumont [F.], President of the Manchester Society of Architects; John Woolfall [F.], President of the Liverpool Architectural Society; Edgar G. C. Down [A.], on behalf of the Cardiff, South Wales, and Monmouthshire Architects' Society; and Herbert Davis [F.], on behalf of the York Architectural Society, that they would bring forward the following motions at the meeting—viz.

1. That this Institute is in favour of the general principle of the compulsory examination and registration of architects;
2. That a Committee be appointed to consider what steps should be taken to give effect to this principle, and to report thereon to a Special General Meeting before the opening of Parliament;
3. To nominate this Committee,—

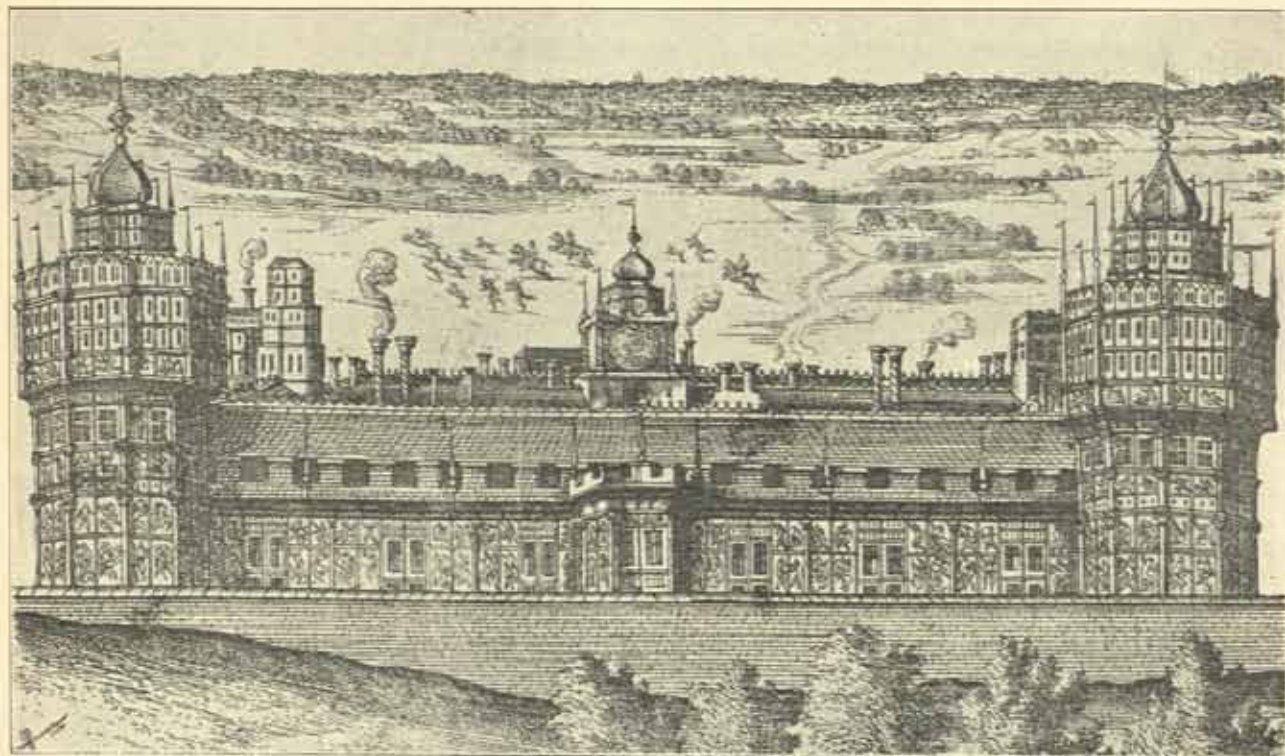
Mr. G. A. T. Middleton formally moved the first Resolution as above, and Mr. Butler Wilson moved the following as an amendment—viz. That a committee, consisting of the Council of the Royal Institute of British Architects and representatives of the Allied Societies, be appointed to consider what steps should be taken to give effect to the principle of registration, and to report thereon to a Special General Meeting. The amendment was seconded by Mr. G. C. Ashlin, R.H.A., President of the Royal Institute of the Architects of Ireland, and supported by Mr. J. W. Beaumont.

Mr. J. Macvicar Anderson moved as an amendment, That a committee, consisting of the Council of the Royal Institute of British Architects, representatives of the Royal Institute of British Architects, and representatives of the Allied Societies, be appointed to consider the principle of registration, and to report thereon to a Special General Meeting. This amendment was accepted by Mr. Butler Wilson, and seconded by Mr. H. T. Hare [F.].

The following Resolution was then put by the President, and carried, against one dissentient:—

RESOLVED, That a committee, consisting of the Council of the Royal Institute of British Architects, and representatives of the Allied Societies, be appointed to consider the principle of registration, and to report thereon to a Special General Meeting.

The proceedings then closed, and the Meeting separated at 9 p.m.



Nonnath Palace. From an Engraving by Houtnagel.

LEAD ARCHITECTURE.

By J. STARKIE GARDNER, F.S.A.

Read before the Royal Institute of British Architects, Monday, 18th January 1904.

THE winning and working of lead, before iron and coal loomed so large, formed one of our three great staple industries—only, in fact, exceeded by wool and tin. A trade in both these metals appears to have existed in Britain before the Romans visited it. While in Spain and elsewhere lead was laboriously mined, in Britain it was found so abundantly, and so near the surface, that laws were voluntarily imposed to restrict the output. Strabo and Diodorus confirm Pliny as to the importance of the British trade both in tin and lead; and no doubt the reputed mineral wealth of Britain alone caused the Romans to covet its possession. They, having already successively annexed the rich mines of Sardinia, Spain, and Attica, became, on reducing Britain, masters of the whole of the silver-lead produce of the known world. Pigs of lead lost in transit and now recovered are evidence that they did not allow any interval to elapse between the extension of their conquests and the working of our mines. Nor can it be supposed that lead-mining was more than interrupted even by such catastrophic events as the departure of the Romans, the settlement of the Angles and Jutes, and the Norman Conquest. In later times some of the Dukes of Cornwall, noted for their wealth and display, derived their revenues from mines, those of Combe Martin contributing especially to the wealth of the Black Prince. Exports of our three staples increased under such warrior merchant princes as the third and fourth

Edwards and Henry VII., all of whom managed their fiscal troubles in a masterful and high-handed manner.

Throughout the Anglo-Saxon and Medieval periods lead maintained its position as one of our principal exports. During these times practically all the churches and palaces in French and Burgundian territories, at least, were covered with English lead. Until far into the eighteenth century England remained the great source of supply for Western Europe. The lead used for Versailles alone under Louis XIV. totalled to thirty-two million livres. Though in later times our maximum production failed to equal our consumption—exceeding 214,000 tons in 1902—it was not until the early seventies that it began seriously to diminish. From over 80,000 tons in 1870 it had decreased to 65,000 in 1882, 31,000 in 1899, and 24,606 in 1902. Cornwall and Devon, the Weardale, Mendips, South Wales, &c., have practically ceased to produce lead, while for Derbyshire, Durham, Cumberland, and Westmorland the output has fallen to little more than 2,000 tons each per annum. This is not due to exhaustion of the mines, nor altogether to the crushing competition of such leviathan lead-production as that of the United States, with 197,000; Germany, 129,000; Mexico, 84,500; and New South Wales, 70,000 tons; for, singularly enough, the Isle of Man has maintained its production of 3,000 tons, while France, Belgium, and Italy, in no better position than ourselves, have increased their outputs to 16,000, 15,500, and 20,500 tons respectively. Our imports of ore for 1902 were less by far than in 1901, while metallic lead increased from 218,060 to 231,813 tons. Our chief remaining customers are precarious Russia, which took 6,500 tons, and France, 2,000 tons.

To uncivilised man lead was useless for war, the chase, or preparation of food. Its existence was barely known in the later Bronze and Iron Ages. Its early history has been dealt with by Lethaby generally, and by Gowland more exhaustively, in *Archæologia*. Its entry into the domain of architecture was most modest. The Greeks, even in the Mycenean age, used lead plates for clamping door-jambs to the walls, and later for dowelling masonry and attaching bronze enrichments. The oft-quoted statement by Herodotus that lead and iron dowels were used for clamping the stones of a bridge over the Euphrates, and by Diodorus that it helped in the construction of the hanging gardens of Babylon, have not been borne out by discoveries.

The properties that make lead specially valuable, and distinguish it from all other metals, are: that it is so yielding that it has been used for seals; that it can be cut with a knife and joined again either with the blowpipe or soldering iron; it can be melted in a ladle and cast in any matrix without special apparatus, or hammered with a mallet or bent by the hand. Capable of producing the most delicate and lacelike effects, or of covering with an impervious sheath the most extensive buildings, it equally defies the ravages of time and the corroding influences of air or of water. It succumbs to the attacks of fire alone, and even then only the workmanship expended upon it is lost. Under the murky pall of our great cities its hue deepens to a sombre black, but if weather-beaten in purer air it oxidises to a silvery white, producing contrasts of light and shade which are exquisitely beautiful. Formerly richer effects were obtained by gilding and painting in chevrons of colour or powdered devices, or by varying the surface with inlays of tin, or incising patterns and filling them with minium, white oxide, or black asphaltum. It quickly tarnishes, but freshly melted or cleaned its surface is lustrous as silver; and this, if it were worth while, might perhaps be preserved by coating it with vitreous glaze dissolved in fluoric acid.

Its pliant texture suggested to the Greeks its first decorative application in architecture. An Ionic capital from the Temple of Ephesus, in the British Museum, has its volutes inlaid with a fillet of lead. The idea of inlaying lead into stone may have reached the Anglo-

Briton, the most expert metal-worker of that time, from the East. With abounding supplies of lead he did not neglect this means of decoration. William of Malmesbury, writing probably about 1135, describes an ancient pavement in Glastonbury Abbey as formed of "stones designedly inlaid with triangles and squares, and figured with lead, under which I believe

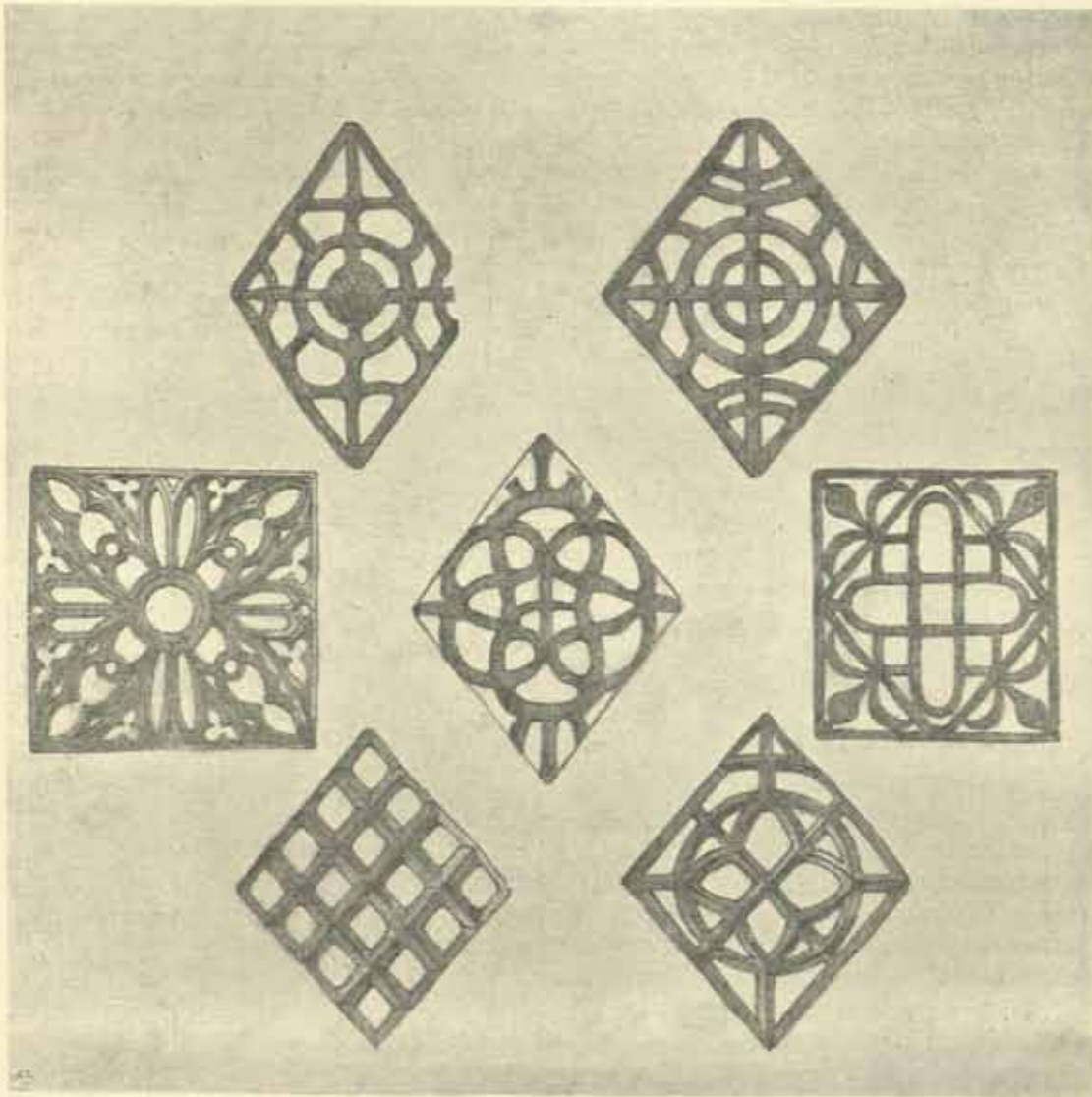


FIG. 1.—LEAD VENTILATING QUARRIES FROM HAMPTON COURT PALACE AND HADDON HALL.

some sacred enigma to be contained." The finest existing example, really a superb specimen, of fourteenth-century work is that now in the Church of St. Remi of Rheims. The stone slabs are each about two feet square, placed diagonally, and each with an exquisitely drawn figure-subject inlaid within a quatrefoil frame and fine geometric border. An excellent illustration was published in the *Building News* for 9th October 1874. Though unquestionably refined in effect, it could not hold its own against the more richly coloured *opus sectile*, inlaid marbles,

or encaustic tiles needed for the gorgeously coloured interiors of the period. A renewed appreciation of black and white for pavements was reserved for a later date. Similarly inlaid stone slabs with effigies and inscriptions outlined in lead, like that in St. Mary Redcliffe, Bristol, were eclipsed by slabs of polished Purbeck marble or alabaster, inlaid with plates of incised brass, often gilded and enamelled. A sparing use of lead was also made in ceilings and vaultings, where the gilded stars are of lead. The pomegranate pendants and leaves at the intersections of the geometric ceiling to Cardinal Wolsey's cabinet at Hampton Court are of lead, like the enrichments to the ceiling of the Chapel Royal, St. James's. Mr. John Jackson indeed informs me that even as late as Charles I. it is not uncommon to find the enrichments of moulded plaster ceilings in lead.

The glazier also was a great consumer of lead; and windows, like those in Salisbury Cathedral, often depended for the decorative effect entirely on the grace and intricacy of their leaded lines. Very beautiful plaques of perforated lead replaced one or more of the quarries of a window for ventilation. They are usually lozenge-shaped, but may also be square or round, and are met with in the offices and corridors of Tudor buildings, such as Hampton Court and Haddon, in considerable variety. A square example of the fifteenth century, illustrated in the twelfth volume of the *Archæological Journal*, page 105, and another from Hampton Court are included in our illustration, which comprises others of the lozenge-shape from the same palace and from Haddon [fig. 1].

The great use made of lead for fanlights and balusters by the brothers Adam is familiar to all. An illustration from the original drawing of the time, made and no doubt executed for Drapers' Hall, is interesting as having the price noted upon it—an exceedingly moderate one [fig. 2].

The simplest and most natural method of using decoratively a metal so fusible as lead is to cast it in moulds. The Greeks used it in their best days in this way for weights, ornamenting these, as may be seen in Lethaby's drawings, in the same beautiful and artistic manner as their coins. No mode of preparing lead for use, except casting in sheets and hammering these out, was known until late in the Middle Ages. The pigs always, and sometimes the pipes, were cast with inscriptions in relief, to which supplementary words and numerals might be added by incising. Inscriptions were incised on tablets of lead by Egyptians and Assyrians, Greeks and Romans, the latter even producing books of lead. There are Anglo-Saxon inscriptions on the cover of a book of lead. Since then tablets of every description for commemorative purposes have been produced in lead and in all ages, both with inscriptions incised and in relief.

The Romans first employed a method of decoration used later by Sussex and other mediæval ironfounders. Small objects in relief, such as escallops shells, beaded rods, plain rings, &c., were impressed as decoration into the beds of sand upon which the sheets were cast. Quite rich effects were produced by skilful arrangements of these, and are seen on Romano-British coffins and cists. Much more rarely they cast decorative objects in moulds specially prepared, like the well-known cup in the British Museum. Some richly decorated lead coffins were found under the pavement of the Temple Church, four illustrated by Edward Richardson in 1845; and many mediæval cists and minor objects in lead, decorated with moulded ornament in relief, are scattered in museums.

The chief uses of lead in architecture, however, are in relation to water, either with a view to its inclusion or exclusion. The plumber's craft, as the name implies, depends solely on lead, which, whether to contain or conduct or exclude water, stands without a rival. The craft was first mastered on a grand scale by the Romans, but not till after their conquest of Britain. There is even reason to assign to the mystery a British origin. Pliny comments

on the vast quantity of lead used in sheets and pipes for supplying water to cities and baths, but the quantities used in his day were trifling to those absorbed for such purposes under Domitian, Nerva, Trajan, Severus, Caracalla, and their successors down to the third century. In England lead pipes have been found in Roman foundations, and at Bath is a massive water channel of lead an inch thick. During the Middle Ages the great ecclesiastical establishments were unsparing in its use, and Wolsey only followed contemporary custom in bringing water from a distance of three miles in lead pipes to his palace at Hampton Court. These mains weighed 15 lb. to the foot, and, at the present price of lead and value of money, would have cost some £50,000, according to Lawes. It is interesting to note that the pipes were made

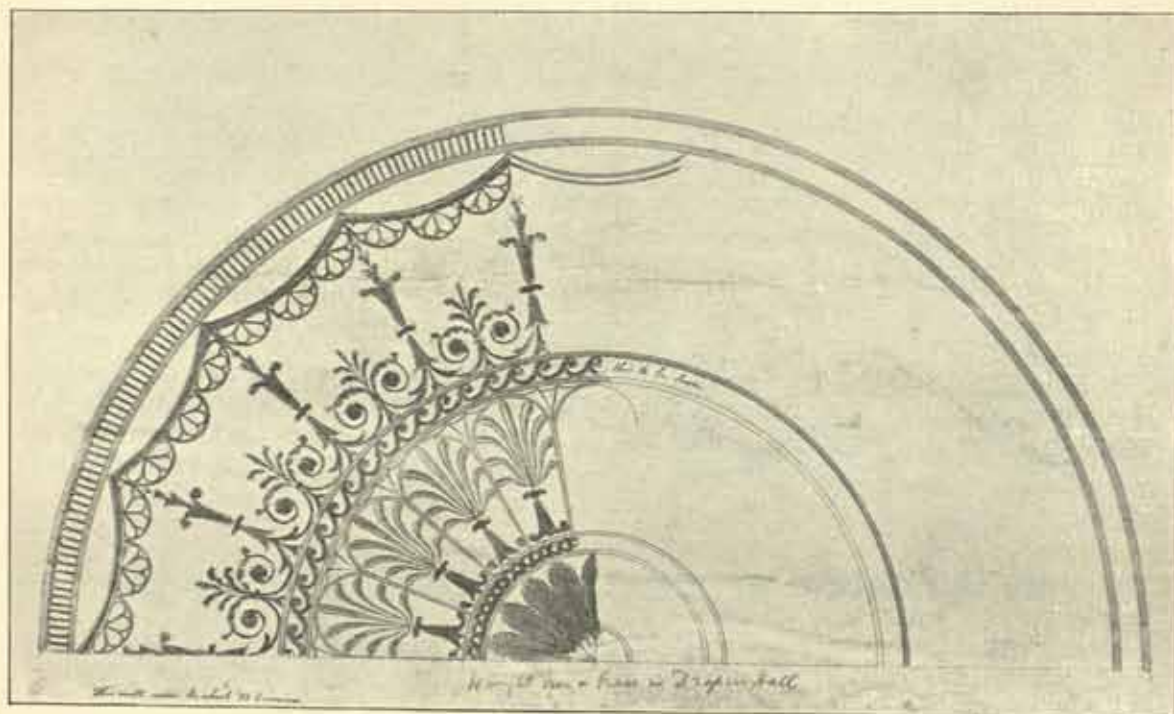


FIG. 2.—FANLIGHT. From an original drawing by the Adam Brothers for Drapers' Hall.

exactly as the Romans made them, the lead being cast into sheets, turned over, and united at the edges by burning, without solder. Water was brought into London houses by lead pipes in 1582—for the first time—by Peter Morris, a Dutchman.

That extensive use was made of it in Anglo-Saxon times is evidenced by Turketul covering even his out-buildings with lead, including a bath room, in 978. The contemporary metal work renders it probable that their lead work was not undecorated. A small lead cistern in the Lewes Museum, of Anglo-Saxon make, illustrated by Lethaby, bears a triangular panel of interlaced ornament. There are about thirty fonts of lead preserved in England, and, though none actually date from before the Norman Conquest, they show the English modes of decoration.

Leaden spouts for relieving the gutters formed at times a picturesque feature in mediæval buildings. Of greater interest were the conduits or central distributing fountains which generally occupied some accessible place in one of the courts of every princely dwelling. Unfortunately none perhaps now exist, but there are records of those formerly at

Westminster, Richmond, Hampton Court, Windsor, Nonsuch, &c. Most of these were under canopies, like so many still existing on the Continent, and lead entered very largely into their construction. One of the earliest was erected by Henry III. in Palace Yard, and the latest by Henry VIII. at Windsor, in 1555, to which the water was conducted from a distance of five miles. A dragon spouted water under a gorgeously decorated canopy of lead-work. Unlike wells, these necessitated bringing the supply from a higher level or a water tower. The supply to the Standard in Cornhill, with its decorative lead-work and four water-spouts, was carried over the steeple of St. Magnus'. The great Westcheap conduit of 1285 had a lead cistern battlemented with stone, the water being conveyed to it in lead pipes from Paddington. That of Gracechurch Street was modelled with representations of the nine worthies, comprising Henry VIII. and his son. The renewing of their painting and gilding on the entry of Philip and Mary cost the city a "fifteenth."

The decorated tank or cistern for storing rain water, still a familiar object, may be of great antiquity; but the earliest preserved, of the sixteenth century, bearing "E.R." and royal arms, has been figured in *The Builder* [in 1862, page 602]. Only about one-tenth are of the seventeenth century. An unusually well-modelled example of 1685, bearing the arms of the Fishmongers' Company, and now belonging to Mr. Merthyr Guest, is illustrated as an example of the degree of relief that may reasonably be applied to panelled lead-work [fig. 3]. Between Grosvenor Square and Bond Street, on the south side, I observed eight of these old cisterns in areas—an indication of the vast number that must still exist. Still in association with the tank cisterns may sometimes be seen in country houses the cistern-like heads to the rain-water pipes which fed them. Examples of the latter, of sixteenth-century date, are far from rare, those at Hampton Court, with the cipher of Henry VIII. and Tudor badges, being probably the earliest remaining. Nowhere, perhaps, can a greater variety be seen than at Haddon, while the most elaborately decorated are at Oxford, in St. John's College and the Bodleian. There are good specimens at Charlton, and, indeed, there are few country houses of Tudor or early Stuart date without them. In those old artistic days even the pump was made a vehicle for decoration, like that formerly in Leathersellers' Yard, which was surmounted by a mermaid pressing her breasts, out of which wine ran on State occasions.

Besides the old conduit fountains intended for everybody's use, others of lead were at a later date put up in gardens and in courtyards purely for decoration, but nowhere equalling in magnificence those of Versailles and the Trianon.

Here our references to lead-work in architecture, connected with the supply of water, cease, reopening, let it be hoped, a vast field of art possibilities to the plumber.

In the seventeenth and eighteenth centuries much of the purely decorative statuary produced in England was of lead, especially the massive equestrian statues, the first of which, that of Charles I., by Hubert Le Sœur, was cast near Covent Garden in 1633, and erected by Charles II. at Charing Cross in 1674. Le Sœur was a pupil of John of Bologna, and was in 1630 attracted to this country, where he died. The figure—horse and man—is still the finest we possess. A second, that of George II., so disgracefully mutilated and destroyed in Leicester Square, came from the Duke of Chandos' estate at Canons, a museum of lead statuary, and was placed in the Square in 1754. There are several of William III. of lead in the provinces and Ireland. Statues and vases were also made in immense quantities for the garden, where lead reigns supreme. Softer and greyer in tone, more yielding, less costly, and less pretentious than bronze or marble, lead seems, above all other materials, to lend itself to this purpose. It is an English domestic metal, suited to our climate and surroundings. A gentleman I sometimes visit has between four and five score of leaden statues dispersed over his extensive grounds. They consist of reproductions from the antique; of eighteenth-century

renderings of gods and goddesses ; and of more modern subjects such as musicians, dancers, mummers, skaters, shepherds and shepherdesses, gardeners, &c., in contemporary costume. This latter group is by far the most interesting, many of the figures being conspicuously dainty, surpassing in elegance and refinement contemporary productions in biscuit and porcelain. The majority of these were probably produced in the two celebrated Piccadilly ateliers, though there must always have been a considerable importation from Holland. These are all of life size ; but groups of heroic size, Cain slaying Abel, Hercules and Cacus, &c., are sometimes met with, like the set of four at Harrowden. The vases range in style from that of the Queen Anne period to that of the brothers Adam, and are most massive or very lightly cast. In a fine



FIG. 2.—A LEAD CISTERN WITH THE ARMS OF THE FIRMINGERS' COMPANY, IN THE POSSESSION OF MR. MERTHYR HUGHES.

example at Belvoir all is cast except the body, decorated in embossing with a Bacchante procession. Some of the finest examples grace the piers of entrance gates, as do lions, stags, sphinxes, heraldic beasts, &c.

We now come to our subject proper for this evening, Lead Architecture.

From Homer to Virgil, through Western Mediæval and Oriental romances, down to Spenser in the *Faerie Queene*, traditions of architecture expressed in metal have been dear to the poets, who have dreamed of brazen towers and castles and magic palaces resplendent with gold. Artists, like the painters of the walls of Pompeii, have also revelled in an architecture so graceful and slender as to suggest either metal or the impossible. Herodotus, bringing us from these baseless fabrics to fact, narrates that the inmost of seven circumvallations of Ecbactana was sheathed in gold, and the penultimate in silver. Babylon possessed its hundred gates of solid bronze, besides those of the Palace of the King and of the Temple of

Belus, and many others which opened on the river. Pliny tells us that, besides its world-famed Colossus, Rhodes possessed one hundred other statues of colossal size. The peoples of antiquity vastly fancied gigantic constructions of metals, a taste by no means unknown to Italy and Germany of the Middle Ages. Nevertheless, the intrinsic value of even the basest metals has sufficed to ensure the destruction of objects into which they enter. Two only, apart from perishable iron, have ever been possible in architectural construction with us: copper, with its alloys, and lead, neither of which has at any time been of conspicuously small value. The Romans used bronze, until the conquest of Britain, for covering any peculiarly magnificent building, such as the Pantheon. Afterwards they used lead, Eusebius the Pope speaking of lead roofs in the third century; the domes of the Holy Sepulchre and St. Sophia being still so covered. The Roman occupation notwithstanding, English buildings under the Saxon kings seem rarely to have been constructed of brick or stone. In Iceland, a country bare of wood, and colonised by people as civilised as the English, but which has stood still since its great literary period, practically all the houses, away from Reykavik, are still of peat, both roofs and walls. With us, in a wooded country, they were of wattle or logs. Thus in the seventh century the casing of the wattle minster of Glastonbury with boards was an event to be chronicled. So with the hewn oak church of Lindisfarne, thatched with reeds. With lead plentiful, such structures could immediately be converted into weather- and water-tight dwellings by the not difficult process, to those possessed of money, of sheathing them in lead. The roofing, in the seventh century, of the Church of York with lead by Wilfrid, and the sheathing of that of Lindisfarne by Eadbent, both walls and roof, must have been new and unusual occurrences to have been chronicled by Bede. Only the remarkable events are chronicled, and I have not hitherto met with other statements as to lead-coverings to buildings until Turketul, in the tenth century, sheathed even his out-buildings and bathroom, of planed boards, with it. The blank, however, is partially filled by Viollet-Le-Duc, who states that churches and palaces were at this time entirely covered with lead, and in France artistically wrought. The lead came from England; perhaps the artificers also. To quote from Lethaby: "In Saxon England lead was a staple commodity for export, and used in great quantities at home. English merchants of lead and tin are mentioned as attending the French fairs from the time of Dagobert." Again quoting: "When, about 1090, the roofs of Contances Cathedral had been destroyed, Geoffrey, the bishop, sent to England and called Brisenetus, the plumber, to make afresh the lead-work of the roofs and tower, and to replace a gilt weathercock." English influence at this time, in the person of Alcuin, was paramount at the Frankish Court.

Edward the Confessor built in stone, if few did before him, and perhaps the illuminations to manuscripts in which architecture begins to appear, unless wholly fanciful or reminiscences of Rome, chiefly represent his buildings. Palaces and churches are seen with pillars and arches supporting domed, curving, turreted, and gabled roofs, of scale pattern, possibly of lead, perhaps only shingled, surmounted by obviously metallic vanes and finials. Still churches of wood were built up to the time of the Conquest and even later; and in remote Elgin the great Church of St. Andrews at Pluscarden was built wholly of lead as late as 1378.

Necessarily, with the introduction of stone and brick architecture, sheathings of lead, so desirable for wattle and rough timber buildings, became useless as a covering to any part of the structure except the roof, to which thenceforth it was relegated. At first neither the Romanesque church nor the English battlemented and flat-roofed castle afforded much scope for a display of lead-work, but with the development of pointed church architecture in the thirteenth century came ample compensation. The roofs rising to a great height and becoming increasingly rich, with turrets, *flèches*, crestings, finials, buttresses, parapets, crockets,

gargoyles, and, above all, the lofty steeples, often clustered in threes, as at Lincoln, Ripon, and Canterbury, soaring nearly 500 feet skywards, absorbed more lead, and afforded greater areas for display than ever. In still more extravagant France, the lead always coming from this side the Channel, the roofs appear to form almost half, and that by no means the least picturesque half, of many of the great sacred edifices. The laying of the lead in strips, vertically or diagonally, formed with their rolled overlaps, fretted lines of shadow on the bleached white surfaces, a sufficient decoration. But the taste of the period demanded greater, and even an enamel-like richness. Stowe describes the bell tower of the priory church of the house of St. John as a most curious piece of workmanship, "graven, gilt, and enamelled, to the great beautifying of the city, and passing all other that I have seen." This was destroyed under Edward VI., while the clock-tower of St. Paul's School, with its leaden spire, was won from Henry VIII. by a throw of the dice and sold. Some of the cathedral spires and roofs in France are said still to retain traces of their former gorgeous decoration in gold and colours. This part of the subject, however, has been so often and ably treated, that it can here be passed over.

The Wars of the Roses having broken the military power of the nobility for ever, kings no longer needed to live in fortresses, but in palaces surrounded by "pleasaunces" in place of ramparts and moats. Henry VII., in spite of his usual parsimony, availed himself to the full of this privilege, rebuilding the Palace of Sheen after its destruction by fire in a most sumptuous manner. This seems to have been the earliest revival of great displays of lead in domestic architecture in England, since the roofing with lead of a building earlier in the century had resulted in its being distinguished as Leadenhall. Unfortunately no representation of this building seems to exist until it was decayed; but of Richmond Palace several views are known. Though the structure was of brick, the roof was a forest of turrets, octagons, pinnacles and finials, gold and azure, with the King's arms. The vanes surmounting them were so numerous that "as well as the plesunt sight of them as the heryng in a windy day was right m'vellous to knowe and understand." Special ornaments to the building were the turreted lanterns over the great hall, the clock-case at the west end, the lantern leaded and embattled with fourteen turrets over the privy lodgings, a round structure four stories high, called the Canted Tower, embattled and all covered with lead; besides the Chapel, Queen's and Prince's Closets, Hall, Middlegate, and Kitchen, decorated, embattled, covered with lead, and all equally "special ornaments" of the building. There was also a pleasant fountain of lead in the central court. These particulars are taken from the Parliamentary Survey of 1650. A no less lavish use of lead was made by Wolsey and Henry VIII. in their brick-built palace at Hampton Court. Though not completely destroyed like Richmond, it is shorn of the lead-covered cupolas, octagons, turrets, and louvres, bedecked with finials and pennons, all glittering in gold and armorial bearings, which rendered it for the time the most attractive sight in all England.

But it was only where timber framing entered largely into the construction that the lead was carried down below the roofs and a truly lead architecture could be revived. Shortly after the birth of his son, Henry commenced to build, as an appanage of Hampton Court, the rural retreat of Nonsuch, a veritable palace of lead, dazzling the imagination and baffling description. A German, visiting England in the time of Elizabeth, describes it as built with an excess of magnificence and elegance, even to ostentation. "One would imagine everything that architecture can perform to have been employed in this one work; there are everywhere so many statues that seem to breathe, so many miracles of consummate art, so many casts that rival even the perfection of Roman antiquity, that it may claim and justify its name of Nonsuch, being without an equal." Even the prosaic Parliamentary Survey of 1650 waxes

almost eloquent over its beauty. The lower story was freestone, and the higher of wood "richly adorned and set forth and garnished with variety of statues, pictures, and other antick forms of excellent art and workmanship, and of no small cost." It is difficult to ascertain exactly how much was lead-work, but the stanchions and outposts of the Banqueting Hall, three stories high, and its lantern were "all covered with lead," as were the whole of the wooden battlements, perhaps like those at Windsor, "the great grace and special ornament to the whole building." The upper stories, at least, were "butted round with frames of wood covered with lead," and these with the turrets, water-tower, clock-case, &c., "are the chiefe ornament of the whole house of Nonsuch." I have examined the building accounts in the Record Office, but they only refer to the structure, and do not therefore comprise more interesting details. It was left unfinished by Henry, and on his death was completed by the Earl of Arundel. Mr. Brewer's fanciful restoration, published in *The Builder*, is perhaps too florid, and the illustration on Speed's map of Surrey too poor. The illustration shown [*see headpiece*] is part of an engraving by Hoefnagel of Queen Elizabeth's visit to Nonsuch, in which the building forms almost a background. To restore its beauty we must imagine the gardens, lovely with lilacs, then a great rarity, its fountains of birds spouting water, the pyramid of marble with concealed pipes to playfully souse the unwary, and the pleasant grove of Diana, where Actæon formed a most agreeable fountain.

This which no equal has in art or fame,
Britons deservedly do Nonsuch name.

The palace with all its glories was presented by Charles II. to Barbara, well named, Duchess of Cleveland. The temptation of the lead, so often irresistible, proved so to its covetous owner, and fell a prey to the greedy wrecker. But for the intrinsic value of its materials, especially the lead, the palace might not have perished. It has shared the fate of many others. Passing not long since the fine park of Stallbridge, with its extensive boundary walls and avenues and massive gate piers, I inquired what had become of the house. The tale I heard was that a covetous agent had reported that the land could not be let because of the house, and retired with no mean fortune from the sale of the lead.

One other example of lead architecture has to be described. In 1491 Thomas Wood, a goldsmith and sheriff of London, built a row of shops and dwellings in Cheapside fronted with lead, which every chronicler speaks of as beauteous and glorious to behold. It was built expressly to accommodate goldsmiths: the front was gilded, and it acquired the name of Goldsmiths' Row. Successive monarchs made it their care that its symmetry should not be marred by the intrusion of any more vulgar trade. Stowe describes it as "the most beautiful Frame and Front of fair Houses and Shops that be within all the Walls of London or elsewhere in England; commonly called Goldsmiths' Row, between Bread St. end and the Cross in Cheap. It containeth in number 10 fair dwelling Houses, and 14 Shops, all in one Frame, uniformly builded 4 Stories high, beautified towards the Street with the Goldsmiths' arms; and the likeness of Woodmen, in memory of his name, riding on Monstrous Beasts. All which is cast in Lead, richly painted over and gilt." It was regilt in 1594 by Sir Richard Martin, goldsmith and Lord Mayor, and destroyed in the Great Fire of 1666. No contemporary representation of it exists; but a picture, attributed to Theodore Bernardi and destroyed in the fire at Cowdray, represented the young King, Edward VI., passing it on his way from the Tower to Westminster in 1547. This was happily engraved by the Society of Antiquaries shortly before its destruction [fig. 4]. Unfortunately the façade is almost concealed by the gala draperies hanging from the windows, among which is a tapestry of St. George on horseback, after Raphael. The shops are open as in bazaars and laid out with the goldsmiths' wares,

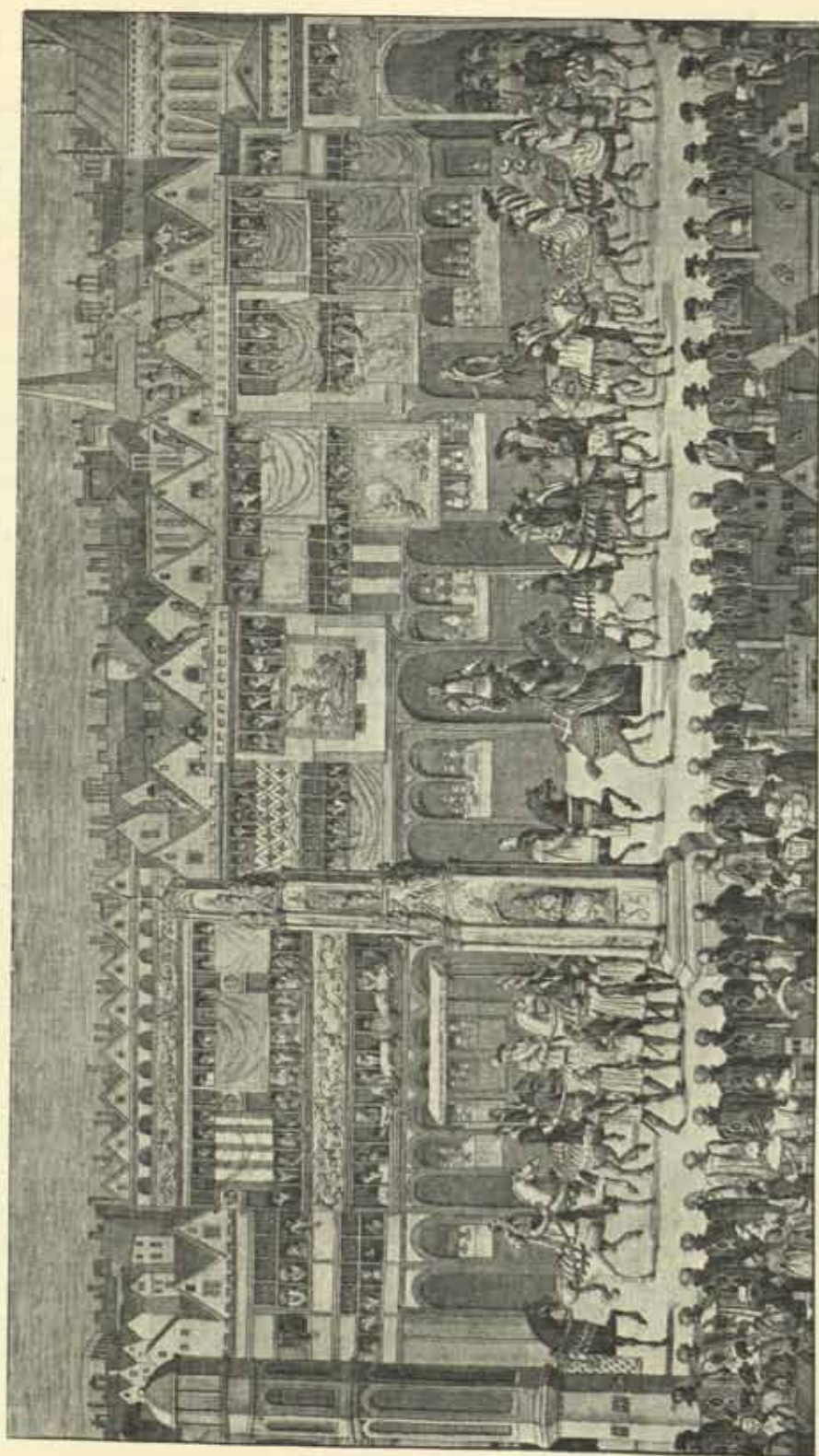


FIG. 4.—VIEW OF GOLDSMITHS' ROW, CHEAPSIDE, SHOWING THE CROSS AND GREATER CONDUIT, *page*, EDWARD VI.
From the Engraving published by the Society of Antiquaries.

inviting the wholesale plagiarism that was a feature of the times. On an alarm these were hastily gathered in, and the commotion and clattering of the shutters is described by an eye-witness when Wyatt thundered at the City gates. The two conduits are represented whose regilding was so costly to the city on gala occasions; and the cross, later so defaced by the iconoclasts that Elizabeth compelled the City to re-erect it in wood, covered with gilded lead. An ancient shop at Lingfield preserves almost precisely, except that it has been glazed, the arrangement seen in the picture.

Lead fell into disuse in consequence, it was said, and of the introduction of some kind of plaster from Italy, more enduring, and capable of more artistic treatment. Many would like to know that plaster.

This concludes our brief sketch of lead architecture in the past. It suffices to show that in Anglo-Saxon times the principal buildings, though of perishable materials, were encased in imperishable lead. Like all other metal-work handed down by the English, it was probably treated in a decorative manner. Encasing buildings with lead, except as regards the roof, was discontinued with the introduction of stone and brick architecture by the Normans, but was revived under Henry VII., when it again became safe to resort to timber construction. The later buildings erected were, we know, cased in lead sumptuously modelled and enhanced by gilding, or parcel gilding, with colours.

Without actually sheathing buildings in lead good effects may be obtained by its use. The circular medallions with busts on the front of Ham House are a great relief to the brickwork, and the large rain-waterpipe-heads often form important features in our Renaissance buildings. Lead might be used at times with advantage for frames and sills of windows and porches, medallions of arms, inscriptions, balustrades, &c., and also for panels, the plinths for statues, and other portions of monuments; and works of art can be produced in it with great facility.

It is specially decorative in gardens.* Its use might be extended with advantage to garden balustrades, temples and tea-houses, fountains, &c., being less costly by far than bronze, and even than stone when richly carved; while, unlike the latter and terra-cotta, it defies frost.

In architecture its use could be largely extended. A work in lead of a novel character is the covered bridge over Northumberland Street connecting the Grand Hotel with its annex, carried out for Mr. William Woodward and illustrated in the article on metal-work of the tenth edition of the *Encyclopædia Britannica*.

With the present tendency towards a fireproof girder construction for streets of offices and shops the fronts might be almost entirely of lead and glass with a backing of cement, or teak if necessary. An advantage of lead panelling is that it can be attached direct to the iron joists, as in the bridge, without support from below. It may also be left undecorated or can be painted. The advantages of this entirely metal treatment for shops, where as much as possible of the space available is required to be of glass, are obvious.

It is impossible to devise anything more suitable than lead for the external construction of winter gardens or orangeries attaching to country houses, hitherto usually left to the taste of the horticultural builder. Lead holds no damp, provides no shelter for insects, and never requires painting; it also remains intrinsically worth a large proportion of its prime cost. Such buildings would be susceptible to endless varieties of treatment.

* Among the illustrations were two figures of a set of four for a garden, modelled by Mr. Stuart for casting in lead.—[Ed.]



FIG. 5.—LEADEN BRIDGE OVER NORTHUMBERLAND STREET, STRAND.
Executed for Mr. Wm. Woodward [4.] by Messrs. Starkie Gardner & Co.

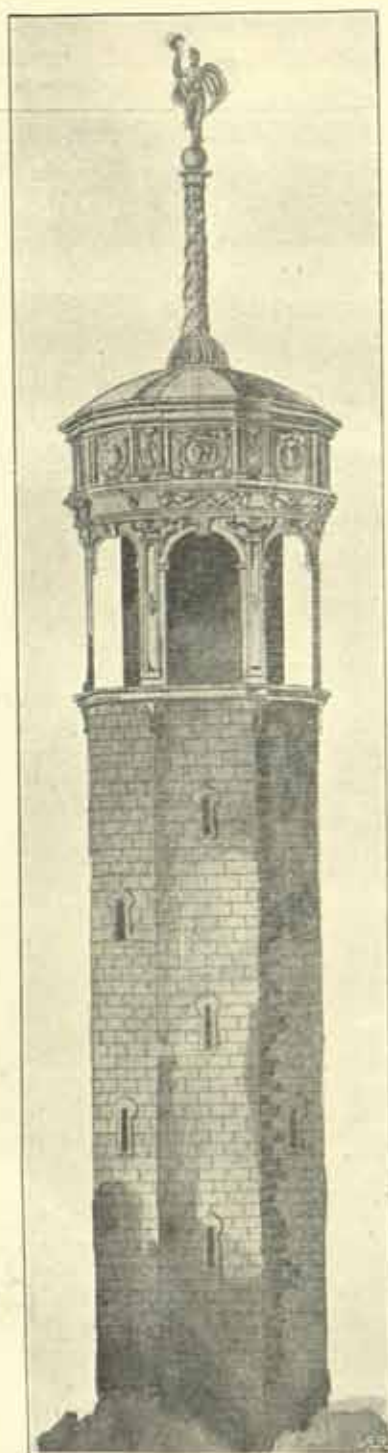


FIG. 5.—LEAD TANK WITH GHIQUETTE FOR A WATER-TOWER.

Again, for entrance lodges in woodland districts, where half-timber construction is desirable, or for riverside residences exposed to floods, a lead sheathing would be particularly appropriate and picturesque.

Finally, for monumental purposes, lead is in many cases more appropriate than bronze, and should be produced for half the cost. Especially is this the case where water is in question. The reservoir or tank surmounting a water tower might be of lead treated picturesquely with the tower of brick. Fountains of lead in open spaces, and for use, have an old-world look.

This Paper is a plea by a metal-worker for the restoration of one of the ancient metal crafts. Lead is, as we have seen, a metal which has been intimately associated with English life, even before the art of building had come into existence, and is peculiarly adapted to our climate. The lead mines, once dotted over almost the whole of the outcrop of archæan rocks from Cornwall to Caithness, are now moribund, and await some impulse from without to regalanise them into life. No body of men could more rapidly influence this result than the important Institute I have the honour to address.

Our consumption per annum of lead is roughly 220,000 tons, of which 200,000 are imported and 20,000 produced at home; and its price per ton to-day may be taken at £10. British production has steadily diminished during the last twenty-five years from over 80,000 to about 20,000 tons, *pari passu* with a gradual decline in price from £20 per ton to £10. To restore our mines the price must perhaps be restored to its former level. With our present increased wealth and population, it may be assumed that our lead production would rise to 100,000 tons, leaving 120,000 still to be imported. This at £20 per ton would cost £2,400,000, of which half would go to the Exchequer, the net result being that we should pay the foreigner less by £800,000 than at present, while our own industrial population, winning 100,000 tons of lead at £20 per ton, instead of 20,000 tons at £10, would be enriched by £1,800,000 per annum. Thus, through the consumer paying 4d. per lb. for lead, as he was content to do twenty-five years ago, the Exchequer would be richer by £1,200,000; £800,000 would be kept in the country; an industry dying out would be rendered flourishing; and an extra £1,800,000 would be distributed among our industrial class, finding athletic outdoor employment for fully 10,000 operatives.

DISCUSSION OF MR. STARKIE GARDNER'S PAPER.

Mr. JOHN SLATER, *Vice-President*, in the Chair.

MR. R. PHENÉ SPIERS, F.S.A. [F.], referring to the Palace of Nonsuch, said that in a Paper read at the Institute by Mr. E. T. Robinson many years ago it was claimed that all the decoration of the exterior was done in that plaster to which Mr. Gardner referred as having been introduced from Italy. He should be quite willing to agree with Mr. Gardner that the bas-reliefs which decorated the palace of Nonsuch would have been infinitely better in lead than in plaster, but he would like to have more evidence as to their being in the former material. Having Mr. Robinson's Paper in mind, he had questioned how such plaster decoration could have been protected sufficiently to last such a long time. In parts the decoration was not protected by projecting gables such as are found in many English houses where plaster decoration exists. Throughout France, in the beautiful roofs, gable-ends, finials, &c., lead seemed to have been employed decoratively to a much greater extent than was the case in England. He remembered seeing at Rouen three or four massive finials, some six or eight feet high, which were also beaten in lead. He only saw them in the Museum; but raised aloft in their position at the end of a gable they would be very prominent and important features. With regard to the Roman lead coffins Mr. Gardner had referred to, there were two or three in the Louvre, brought over, he believed, by M. Ernest Renan from Syria, with precisely that decoration of bead and reel as described. He had often noticed the little bridge across from the Grand Hotel at Charing Cross to the opposite building, and it had never occurred to him that it was in anything else than stone. It was a graceful little structure, and very well decorated. It was interesting to hear that such a feature could be produced absolutely fire-proof, and in a lasting material. Mr. Hall, who had just left the meeting, had told him that he would do his best to introduce lead in a water-tower. That might give Mr. Gardner some hope, for Mr. Hall had had many water-towers to build; and if the result of the Paper was to induce some architects to employ lead to a greater extent than had hitherto been done—to revive, in fact, an old manufacture—he was sure Mr. Gardner would not regret the time he had given to its elaboration. He begged to move that a very hearty vote of thanks be given to Mr. Gardner. He had been occupied with this subject for five or six years at the least, thinking in what way he could bring the material into greater prominence for decorative work.

MR. ERNEST GEORGE [F.], in seconding

the vote of thanks, said he had been very much delighted with the Paper and illustrations; and hoped they would be wiser in their use of the metal.

MR. MAURICE B. ADAMS [F.] asked Mr. Gardner how large he proposed the sheets of cast lead for metal-cased architecture should be made, supposing such buildings as he suggested should be erected. Mr. Gardner's suggestion appeared to be a good one. In many of our commercial buildings the multiplication of voids, as compared with the structural part of their façades, was gradually making the proper and adequate treatment of the intermediate spaces a matter of some difficulty. In the application of lead the size of the sheets had always been an awkward matter. If they were enriched with ornament some of the parts would be rather heavy, and would require some special fixing; and although pilasters would be employed to cover the butt joints of the two sheets, it would be useful to know how large these sheets could be easily made, and what was the best way to fix them, so as to exclude the weather and give full play to the expansion and contraction of the metal. Mr. Gardner had not mentioned the "de-silverisation" of lead, and why it was that in manufacturing lead its makers seemed to take all the silver and arsenic out of it, so that, instead of assuming the white and silvery-grey appearance which made the old spires of Long Sutton and others in Lincolnshire and elsewhere look so charming, the metal assumed a horrid black tone which was aggravated by the builders nowadays putting turpentine to perpetuate that dismal colour. He would like to know whether there were any manufactories where the lead could be purchased in its genuine form; and whether it would be dearer than the ordinary lead? As to the artistic treatment of lead, it must vary with people's tastes; they must, however, get out of the mechanical way in which almost all materials were nowadays applied. One had but to look at the old spires and old roofs to find how irregularly their details were devised: instead of having the roll on the top of the edge to give a uniform and straight line, the timber itself varied slightly, giving a wavy, ridged line, and the rolls were carried right up to the ridge and allowed to break the sky-line; instead of having the longitudinal roll, which was now almost always introduced, the lead was simply brought up to lap over on the other side. He was aware that there was danger of the wind catching large sheets of lead. Lord Grimthorpe, he believed, had had some difficulty with the creeping of the lead on St. Albans

Abbey, because he would not do it in the way Mr. Longmire proposed to have it done, and as a matter of fact much trouble was involved subsequently. These were points which had to be considered by the old builders in putting up the immense spires like the one over old St. Paul's Cathedral, which was burnt down many years before the Fire (1561). This spire, he believed, was 520 feet high above the ground, and was covered entirely with lead. The wind pressure on those old spires must have been tremendous, and the way the lead was clipped or fixed down was necessarily a matter of extreme importance.*

Mr. HOWARD SETH-SMITH [F.] said he supported the vote of thanks very heartily. They had been listening, he supposed, to their greatest archaeological authority on metal work; he did not know whether he was not the greatest international authority on the subject; certainly he was the greatest in England; and it was extremely interesting to have his experience and his taste to guide them. One hoped that the suggestions thrown out might be made use of by their younger architects as well as by the older ones so far as it became possible. As to the colour of lead, he sympathised with Mr. Maurice Adams thoroughly; on turrets and other roof features it was most unsatisfactory owing to the way the lead was prepared now. Lately in Frankfurt, looking at the half-timbered buildings in the old square, he remarked especially the lovely effect of the lead lace-work on the verges of the gables. Nothing could be more beautiful than the refined line given by this lead-work with all its rich detail. He had passed, too, a building in London the other day, designed, he believed, by Messrs. Niven and Wigglesworth—a Sailors' Institute by the East India Dock Road, where lead appeared to have been freely made use of, and with very charming effect: it was introduced into the panels of the front over the main entrance. Mr. Starkie Gardner had mentioned the use made of lead in the production of sundials, also the balustrades to staircases, some of which were very charming in London. They would be glad to have Mr. Gardner's views as to wetting the lead, instead of using rolls, which were usually so very ugly, especially of the size builders now adopt. The low relief of the wetting was so much more beautiful that it might be well to adopt it instead of putting the rolls on, especially in features of small scale.

Mr. E. W. HUDSON [A.] said Mr. Gardner's idea as to the application of lead to the upper part of a water-tower was a very practical and

interesting one. When, however, anything like lead was applied to a fountain at or near the level of the ground, he was afraid they would run the risk of having the delicate part of the work at any rate damaged by the juveniles, or stripped off and taken away by thieves. He was interested to hear Mr. Gardner bring in the instance of the tower of St. John's Priory, Clerkenwell. He had often wondered what Stowe's description referred to; it seemed to him to refer to some graven and enamelled panelling, such as mosaic, and not to anything in the nature of lead-work.* They all remembered the notable application of lead to statuary in the negro that used to stand in Clement's Inn. What had since become of it he did not know. He believed lead was used considerably in the Middle Ages for images of saints, &c. A small lead image was found in an old sewer close by St. John's Gate in 1860; † Louis XI. used to carry such little images in his hat.

THE CHAIRMAN, in putting the vote, said that some of the illustrations made them regret that they had not now in London anything, for example, so charmingly picturesque as the view given of Goldsmiths' Row. He agreed with Mr. Adams with regard to the desilvering of lead; there was no doubt that the lead now used for roofs was very different in quality from that used

* It had not occurred to me, until Mr. Gardner suggested it, that the decoration of the tower of St. John's Priory, Clerkenwell, referred to by Stowe, might have been of metal. I do not, however, know of any evidence whatever for its being of lead, but as to its position one may gather from his description that it was on the higher part of the tower and visible for some distance away. It may, therefore, have been of the nature of cresting, *flèche*, or spire. Stowe writes: "The great bell tower (a most curious piece of workmanship, graven, gilt, and enamelled, to the great beautifying of the city, and passing all other that I have seen) was undermined and blown up with gunpowder, &c." We are unable to tell what was the style of architecture or what the date of this tower. There is, I believe, no drawing of it extant, but it would appear from the force required to destroy it that it was a large and well-built structure. It dated most likely from the end of the fourteenth century (after the destruction of the Priory under Wat Tyler), or at the end of the fifteenth century, when Prior Docwra completed the buildings. It is not so likely to have been of the twelfth century, the date of the foundation, unless it escaped the fire; but if this improbable supposition were a fact, we should not expect to find an elaborate metallic finish to the roof unless a story had been subsequently added. I believe it to have stood just to the north-west of the nave of the church (without being actually part of it) where Jerusalem Passage enters St. John's Square, and certainly not at "a crossing," as some writers have surmised. The late Mr. H. W. Brewer's picturesque and imaginative drawing is quite unreliable, as are also the re-issues of Van den Wyngaerde's and Newton's bird's-eye views. Stowe does not mention lead as the material used for the "graven and enamelled" work, and any evidence as to its actual composition would be of great interest.—E. W. H.

† This was a small image of Christ, once part of a crucifix. It may or may not have once belonged to some inmate, but without connection with the architecture.—E. W. H.

* With regard to the lead casing of "Nonsuch," mentioned by Mr. Gardner and questioned by Mr. Phené Spiers, it may be interesting to note that Pepys describes the building as sheeted with lead. He was there in 1665, and says, "One great thing is that most of the house is covered, I mean the posts and quarters in the walls, with lead and gilded."—M. B. A.

200 years ago. As to putting up towers, turrets, and elaborate erections in a perishable material, and covering them with an imperishable material such as lead, he was not sure whether the effect of that covering would be as permanent as some seemed to think. It had been his experience, in treating an old house where there had been a timber turret covered with lead, to find that the lead had cracked in several places, and had not been looked after; consequently the water had got in and caused the timbers behind to rot in a most disastrous manner. The treatment Mr. Starkie Gardner had alluded to, of covering concrete and metal material with lead, would undoubtedly prevent that, and seemed to be quite a feasible method of using lead construction. With regard to the size of the sheets he thought that in any treatment of lead as surface decoration they must not have too large panels.

MR. STARKIE GARDNER, in reply to Mr. Spiers, said that he had spent almost two days in looking over the accounts of the building of Nonsuch, and had found that plaster of Paris was used there, which was a gypsum plaster, and of no use for external work. From what he had read, he did not think that any kind of plaster was known at that time which would have been available for modelled panels; and, although there was some doubt about the exact meaning of the descriptions, he did not think, by the light of the earlier buildings in Goldsmiths' Row, there could be any doubt that the whole of the decorative work of Nonsuch was actually cast lead-work. The figures were clearly so—in fact, the account as good as stated that all the decoration to the upper stories was lead. He had not had very much experience in lead construction; the largest work he had had to do was the bridge across Northumberland Street, and in that case he had cast panels—cast in sand in an open mould, just as the old firebacks were. So far as he could recollect, the size of the panels would have been about 4 feet by 3. But there was no difficulty whatever in casting lead; if they had enough heated metal and enough caldrons to pour from, they could run the casting over a panel of 10 feet. He did not, however, recommend cast panels of such large size because of their unwieldiness, and, moreover, he did not think there would be any advantage in doing what would to a great extent be a *tour de force*. There was no better fixing for lead than by screws, screwing it to the iron. But care must be taken to give an amount of play; the screw-holes should be elliptical, so that the lead might move on the fixings; otherwise there would be a tendency to buckle in changes of temperature. Their aim should be to get the panels as thin as possible. Where there was a good deal of relief one had less control over it,

but for flat bas-relief it could, he thought, be run a quarter of an inch.

MR. ERNEST GEORGE: May the lead safely touch the iron?

MR. STARKIE GARDNER: Certainly. There was no action between lead and iron unless there was water between them. Dry junction had no effect whatever; there was no galvanic action going on except water were present. The oxide—that white colour that came to old lead—was a very curious thing. He could not conceive that it could be due to silver, because they all knew that silver oxide was black, and he did not think the presence of silver could possibly affect the oxidation of lead. Very possibly arsenic might; he should think it would not be beyond the bounds of science to start that white oxide, if necessary, by a chemical application of an oxidising agent. Any chemist of experience would probably be able to suggest a means of starting it, just as the green oxide on copper could be started. He agreed that it was a great drawback to lead that it should assume that black colour; but he expected that it would pass off with age and become of the proper white that they admired. As regards wetting lead, the drawback to actually joining the joints was the change of temperature. It was necessary to allow a means of contracting and expanding, and that could only be done by some kind of loose joint that was rolled over and watertight. The moment the joints were burned together, buckling and trouble were bound to ensue, so that he had always advocated either strips of lead to cover the joints or lapping the edges one over the other in a way that would admit of movement. In reply to Mr. Hudson he would not suggest that parts of a fountain that could be kicked by children and played with should be of lead. There should always be a stone basin, or something in front to hold the water, and the lead-work could be behind the water where it could not be tampered with and injured. Stowe, unless he had misread him, particularly stated that the tower of St. John's was of lead; that the whole of the work that was decorated and painted and was so beautiful was the lead portion of it. It was not really enamelled, but it had the effect of enamel. It must have been painted, and perhaps painted over gilding in some way to give it that sort of look. There was no doubt that the French always, or in very many cases at least, tried to produce the effect of enamel work on their cathedral roofs. The negro figure that used to be in Clement's Inn had been removed to the Temple, and was in the Temple Gardens now. There were a good many contemporary replicas of it dotted about the country. It was one of the stock models, although it was one of the most beautiful of them.



9, CONDUIT STREET, LONDON, W., 23rd Jan. 1904.

CHRONICLE.

The President's "At Home."

The President's first "At Home" this session took place in the rooms of the Institute on Monday, the 11th inst. These reunions were originated by the President at the beginning of last session, their object being to give members an opportunity of becoming better acquainted with one another, and to bring them together in more genial and friendly intercourse than is possible at any of the regular functions of the Institute. The general feeling among all present on these occasions is that no more delightful means of achieving such an object could be devised. The President's hospitality at this the third event of the kind was enjoyed by little short of four hundred and fifty members, London and provincial—perhaps the largest company of Fellows and Associates ever assembled at one time within the walls of the Institute. At the previous "At Homes" drawings were shown representative of the works of the late J. F. Bentley and W. Eden Nesfield; at the last, the architect of Truro Cathedral, the late John Loughborough Pearson, R.A., was represented—a numerous collection of his drawings having been kindly lent by his son Mr. J. L. Pearson [F.]. The following is a list of them:—

Astor Estate Office—64 sheets.
St. Stephen's, Bournemouth—20 sheets.
Cliveden Hall and Staircase—8 sheets.
Cambridge University Library—6 sheets.
Dalton Holme Tower and Spire—1 sheet.
Freeland Church, Beredon and East Window—1 sheet.
Sidney Sussex College, Cambridge: elevations—6 sheets.
Flagon and Cup—1 sheet.
Headingley Pulpit—2 sheets.
Hove Parish Church—13 sheets.
St. Augustine's, Kilburn—7 sheets.
Ditto, Beredon—1 sheet.
Lechlade Manor House—4 sheets.
St. Agnes', Liverpool—9 sheets.
Ditto, Beredon—1 sheet.
All Saints' Church, Maidstone—1 sheet.
Middlesex Hospital Chapel—2 sheets.
Manningham Bruce Church, Beredon—1 sheet.
Peterborough Cathedral—8 sheets.
St. John the Evangelist, Red Lion Square—2 sheets.

Truro Cathedral—11 sheets.
Ditto, Pulpit and Beredon—2 sheets.
Thurstaston Church, Beredon—1 sheet.
St. George's, Windsor: Altar Cross—1 sheet.
Westwood House—2 sheets.
Westminster Hall—5 sheets.
St. Peter's, Vauxhall: Pulpit and Chancel Screen—9 sheets.

Mr. Pearson, who was a Royal Gold Medallist of the Institute, died in December 1897 at the age of eighty-one, and was buried in Westminster Abbey. Some of his works and drawings are illustrated in the Memoir by Mr. W. D. Caröe which appeared in the JOURNAL for 8th January 1898.

THE PRIZES AND STUDENTSHIPS 1904.

Deed of Award.

The Designs and Drawings submitted for the Institute Prizes and Studentships are now on exhibition in the Gallery of the Alpine Club (entrance in Mill Street, Conduit Street, W.). The exhibition is open every day from 10 A.M. till 8 P.M. until it closes on the 30th January. The Presentation of Prizes takes place on the 1st February.

The Council's Deed of Award, made under seal pursuant to By-law 66, and read at the General Meeting of the 18th January, states that the Council have examined the works submitted for the Institute Silver Medals, the Soane Medallion, the Owen Jones and Pugin Studentships, the Godwin Bursary, the Tite Prize, the Arthur Cates Prize, and the Grissell Gold Medal, and gives particulars of the competitions and the results thereof as follows:—

THE ROYAL INSTITUTE SILVER MEDALS.

(i.) *The Essay Medal and Twenty-five Guineas.*

Eight Essays on "The Delineation of Architecture" were received for the Silver Medal under the following mottoes:—

1. Alpha.
2. "Ars longa, Vita brevis."
3. Bothwell.
4. "Floreat semper fidelis civitas."
5. "Fortuna sequatur."
6. "Resurgam."
7. "The 9th."
8. X.

The Council regret that they are unable to award the Medal, but they have granted a Medal of Merit and Ten Guineas to the author of the Essay bearing the motto "X" [Claude Batley, Little Roundwood, Ipswich].

(ii.) *The Measured Drawings Medal and £10.10s.*

Twelve sets of Drawings were sent in of the various buildings indicated, and under mottoes as follows:—

1. Archer:—6 strainers (St. Paul's Church, Deptford).
2. Baydo:—5 strainers (Morden College, Blackheath).
3. Caylix:—6 strainers (St. George's Church, Hanover Square).
4. Conger Eel:—4 strainers (Lady Chapel, Lichfield Cathedral).
5. Dolphin:—5 strainers (Church of St. Oswald, Ashbourne, Derbyshire).
6. En avant:—3 strainers (The Queen's House, Greenwich).
7. Erin:—4 strainers (St. Nicholas' Church, Old Shoreham, Sussex).
8. Gothic:—5 strainers (Tideswell Church, Derbyshire).
9. Steeple-Jack:—6 strainers (Christ Church, Newgate).
10. Thane:—6 strainers (Glamis Castle, Forfarshire).
11. The Birds:—5 strainers (Priory Church of St. Mary and St. Blase, Boxgrove, Sussex).
12. Vis:—6 strainers (St. James's Church, Piccadilly).

The Council award the Silver Medal and Ten Guineas to the delineator of the Church of St. Oswald, Ashbourne, Derbyshire, submitted under the motto "Dolphin" [Laurence M. Gotch, 62 Lynton Avenue, West Ealing, W.], and Certificates of Hon. Mention to the delineators of Tideswell Church, Derbyshire, and St. James's Church, Piccadilly, submitted under the respective mottoes of "Gothic" [G. S. Salomons, Prudential Chambers, 78 King Street, Manchester] and "Vis" [C. Lovett Gill, 17, Albert Street, Regent's Park].

THE TRAVELLING STUDENTSHIPS.

(i.) The Soane Medallion and £100.

Fourteen Designs for a University Theatre were submitted, under the following mottoes:—

1. Aspirant:—7 strainers.
2. Dom:—6 strainers.
3. Gable Endie:—5 strainers.
4. Hal:—6 strainers.
5. Ionian:—5 strainers.
6. Jonah Man:—7 strainers.
7. Oxon:—7 strainers.
8. Phoenix:—7 strainers.
9. Rannock:—5 strainers.
10. Rotunda:—7 strainers.
11. Sanctus Boscus:—7 strainers.
12. Star (device):—4 strainers.
13. Tay:—7 strainers.
14. X:—7 strainers.

The Council have awarded the Medallion and (subject to the specified conditions) the sum of One Hundred Pounds to the author of the design bearing the motto "Oxon" [Frederic J. Horth, 1, Cavendish Square, Hull], and a Certificate of Hon. Mention to the author of the design bearing the motto "Gable Endie" [David Smith, 33, Albert Square, Dundee, N.B.].

(ii.) The Owen Jones Studentship and £100.

Five applications were received for the Owen Jones Studentship from the following:—

1. W. Davidson:—6 strainers.
2. L. B. Guthrie:—6 strainers.
3. James McLachlan:—6 strainers.
4. Frank Lishman:—6 strainers.
5. H. Morley:—6 strainers.

The Council have awarded the Certificate and (subject to the specified conditions) the sum of One Hundred Pounds to Mr. W. Davidson, 121, Gilmore Place, Edinburgh, and a Medal of Merit to Mr. H. Morley, 66, Sydney Street, S. Kensington, S.W.

(iii.) The Pugin Studentship and £40.

Three applications were received for the Pugin Studentship from the following:—

1. A. E. Bullock:—2 strainers.
2. W. S. A. Gordon:—6 strainers.
3. F. C. Mears:—6 strainers.

The Council have awarded the Medal and (subject to the specified conditions) the sum of Forty Pounds to Mr. F. C. Mears, 65, Sydney Street, S. Kensington, S.W., and a Medal of Merit to Mr. W. S. A. Gordon, 65, Wellmeadow Road, Hither Green, S.E.

(iv.) The Godwin Medal and £65.

Two applications were received for the Godwin Bursary from the following:—

1. H. Phillips Fletcher:—6 strainers.
2. F. R. Hiorns:—6 strainers.

The Council have awarded the Medal and (subject to the specified conditions) the sum of £65 to Mr. H. Phillips Fletcher [F.].

(v.) The Tate Certificate and £30.

Eleven Designs for a Crescent in a large City were submitted under the following mottoes:—

1. Anglic:—3 strainers.
2. Antiquum Oblinens:—3 strainers.
3. Bridge:—3 strainers.
4. Bydand:—3 strainers.
5. Colonnade:—3 strainers.
6. Canny Alnwick:—2 strainers.
7. Crescent (device):—3 strainers.
8. Fleur-de-Lis (device):—3 strainers.
9. Pecksniff:—3 strainers.
10. Porthos:—3 strainers.
11. Red Shield:—3 strainers.

The Council have awarded the Certificate and (subject to the specified conditions) a sum of Thirty Pounds to the author of the design bearing the motto "Bridge" [Heaton Comyn [A.], 14, Great Ormond Street, W.C.], and a Medal of Merit to the author of the design bearing the motto "Porthos" [Arthur D. Nicholson, 19, Royal Crescent, Glasgow].

THE ARTHUR CATES PRIZE: £40.

Four applications for the Arthur Cates Prize were received from the following gentlemen:—

1. J. H. Gibbons:—11 strainers.
2. Baxter Greig:—15 strainers.
3. F. Winton Newman:—11 strainers.
4. John Swarbrick:—18 strainers.

The Council regret that they are unable to award the Prize, but they have granted the sum of Twenty Guineas to Mr. F. Winton Newman, 58,

Savernake Road, Hampstead, N.W., and a Certificate of Hon. Mention to Mr. Baxter Greig [A.], 188, Dulwich Grove, Dulwich, S.E.

PRIZE FOR DESIGN AND CONSTRUCTION.

The Grissell Gold Medal and £10. 10s.

Fourteen designs for a Timber Spire or Lantern Termination were submitted under the following mottoes:—

1. Cardon:—3 strainers.
2. Carpenter:—1 strainer.
3. Celt:—1 strainer.
4. Dew:—2 strainers.
5. Eihera:—3 strainers.
6. Ich Dien:—2 strainers.
7. Le Nord:—1 strainer.
8. Mente Manque:—2 strainers.
9. Oak:—3 strainers.
10. Opal:—2 strainers.
11. Simplex:—2 strainers.
12. Skyline:—3 strainers.
13. Wee Macgregor:—3 strainers.
14. Yddraig Goch:—1 strainer.

The Council have awarded the Medal and Ten Guineas to the author of the design bearing the motto "Cardon" [*J. William Hepburn, 83, Patsall Road, N.W.*], and a Medal of Merit to the author of the design bearing the motto "Ich Dien" [*Arthur Jas. Barclay, 343, Union Street, Aberdeen, N.B.*].

THE ASHPITEL PRIZE 1903.

The Council have, on the recommendation of the Board of Examiners (Architecture), awarded the Ashpitel Prize to Mr. F. Winton Newman, of London. Mr. Newman was registered *Probationer* in 1895, *Student* in 1897, and passed the Final Examination in November 1903.

THE TRAVELLING STUDENTS' WORK.

Soane Medallist 1902.—The Council have approved the drawings executed by Mr. James B. Fulton, who was awarded the Medallion in 1902, and who studied in Italy, Gibraltar, Algiers, Malta, Egypt, Palestine, Turkey, Greece, Austria, Hungary, and Germany.

Tite Prizeman 1902.—The Council have approved the work of Mr. Charles Gascoyne, who was awarded the Tite Prize of 1902, and who studied in Italy.

Tite Prizeman 1903.—The Council have approved the work of Mr. David Smith, who was awarded the Tite Prize for 1903, and who studied in Italy.

Pugin Studentship 1903.—The Council have approved the work of Mr. J. Harold Gibbons [A.], who was elected Pugin Student for 1903, and who studied in Gloucestershire and Somersetshire.

The Deed of Award, bears date 18th January 1904, and is signed by John Slater, *Vice-President*; Ernest George and R. S. Balfour, *Members of*

Council; Alexander Graham, *Hon. Secretary*; W. J. Locke, *Secretary*.

The late Henry Saxon Snell [F.].

Mr. Saxon Snell, whose death occurred on the 10th inst. in his 73rd year, had been a Fellow of the Institute since 1873. He was the son of Mr. George Blagrove Snell, of London, and entered the office of Sir James Pennethorne, afterwards becoming assistant to Sir Joseph Paxton, and then to Sir William Tite. In 1851 he gained the Royal Academy Silver Medal for his measured drawings of the steeple of St. Mary-le-Bow, Cheapside. About 1866 he was appointed architect to the St. Marylebone Board of Guardians, in which capacity he began the reconstruction of the Marylebone Workhouse. Among his principal architectural works were the Boys' School for the Royal Patriotic Fund, Wandsworth; the Convalescent Home for Children, Norbiton; the Holborn Union Infirmary, Highgate Hill; St. Olave's, Tooley Street, Union Infirmary; St. George's, Hanover Square, Union Infirmary; Casual Wards, Marylebone Workhouse; Marylebone Swimming Baths; Infirm Wards and administrative offices for St. Luke's Workhouse in City Road and Shepherdess Walk. In 1887 his designs were adopted for a conversion of the front main building of the Aberdeen Royal Infirmary for administrative and clinical purposes only, and for the removal of all the patients into new pavilions at the rear. He was architect, jointly with Mr. Alfred Williams, of the Kensington Infirmary, and assisted the late Captain Fowke, R.E., on the Dublin Exhibition. Mr. Saxon Snell was afterwards for some years in partnership with his son, Mr. Alfred Saxon Snell, under the style of H. Saxon Snell and Son, and thus constituted the firm carried out extensive works for various Metropolitan Boards of Guardians. A full list of these works appears in *The Builder* for the 16th inst. Mr. Snell retired from practice about seven years ago.

National Registration of Plumbers.

From the Plumbers' Company has been received a facsimile of the portable certificate, or registration ticket, for the year 1904, issued by the Company to registered plumbers. It folds in two about the size of a lady's visiting-card, and bears the number of the certificate, the name, address, and signature of its holder, and the signature of the Clerk of the Company. In the chief cities and towns of the United Kingdom the certificate bears the signature of the secretary to the local district council. The colour of the date printed across the face is varied each year to facilitate identification. It is requested that complaints, if any, of work done by registered plumbers should be addressed to the Company.

REVIEWS.

EGYPTIAN ARCHITECTURE.

L'Art de bâtir chez les Egyptiens. Par Auguste Choisy. Sm. 8vo. Paris. 1904. Price 20 francs. [Edouard Rouveyre, 76, Rue de Seine, Paris.]

When in 1866 I was measuring the theatre of Bacchus at Athens, which at that time had not long been discovered, I found another "chiel takin' notes," with whom I entered into conversation in the course of the afternoon and again on the following day. A few years ago I chanced to refer to the hasty and illegible diary which I kept during my tour, and found the following entry: "Made the acquaintance at the French Academy of an engineer of the Ecole des Ponts et Chaussées, a young man of 23 or 24, remarkably intelligent, and full of theories on all possible points connected with the buildings in the Acropolis, &c. He has, I believe, already written many essays about them which have received the approval of the Institute of France." That young man was Monsieur Auguste Choisy, the distinguished French author, whose works on *L'Art de bâtir chez les Romains* and *L'Art de bâtir chez les Byzantins* have become household words amongst our students in late years.

Among other works, M. Choisy published in 1899 a *History of Architecture*, in two volumes, which is less known, possibly on account of the large number of technical terms in it. In the preparation for this work, which included Egyptian architecture, M. Choisy set forth his views as regards the construction of the Pyramids and Temples, and explained in detail the method of building arches in crude brick without centres, which had already been divined some 12 or 14 years ago. In the new work just published, *L'Art de bâtir chez les Egyptiens*, M. Choisy has returned to the subject, and brought forward a large amount of new material, with minute observations on the various methods adopted by the Egyptians, both in the construction of their stone temples and of their made brick walls and storehouses. In addition to over 100 copper-plate engravings introduced in the text, M. Choisy has added 48 photographs which are of great value, not only because they confirm the views set forth by the author, but as representing subjects and points of view which the amateur or professional photographer would have deemed unworthy of the camera. From M. Choisy's point of view unfinished portions of building and faulty construction are of much greater value to him as exceptions to the rule by which he proves his theories to be well founded.

M. Choisy generally manages to condense into a single page that to which most writers would devote a whole chapter, the result being that in about 180 pages of text, with an average of

20 lines to the page, he has compressed an amount of matter on which many volumes might have been written.

The two most important discoveries in this volume are, first, the reasons why in certain great walls of crude brick at Abydos and Karnak, the courses, instead of being horizontal, are laid in undulating or wavy beds; and, secondly, the machines and the methods adopted by the Egyptian masons to raise their stones into position.

As regards the first, the undulating courses have hitherto been ascribed either to settlement of foundation or to an attempt to prevent destruction by earthquakes; but M. Choisy points out that in some cases they are built upon rock, where no settlement would take place, and earthquakes very rarely occur in Egypt. Having noticed that the walls built in waving courses were invariably near the Nile or some inland lake, whereas high up or in the desert the courses were horizontal, M. Choisy came to the conclusion that the precautions taken by the Egyptians were deemed necessary because, with water in proximity, the moisture from below was drawn up into the brickwork by the heat of the sun in the daytime, and at night this moisture condensed and the crude bricks increased in bulk. If the walls were built on a slope, the lower surfaces being moist there was a tendency to slip, and in any case the swelling of the bricks might cause cracks. To obviate these dangers, if a concave bed were given to portions of the wall it would prevent slipping, and by leaving at intervals open vertical joints, these joints were closed up by the hygroscopic changes in the brick.

In order to raise the blocks of stone M. Choisy gives, amongst others, examples of two levers—(A) a series of levers side by side with a heavy counterpoise; and (B) an assemblage of timber which he calls *l'ascenseur oscillant* (oscillating cradle). This machine (of which he says there are twenty-one examples in the Louvre) is represented in the British Museum by a small model only, which was found in a tomb. This model has always been assumed to be one of a centre on which arches were built; but, as M. Choisy has proved that all their vaults were built without centering of any kind, it must have served some other purpose. The cradle consists of two beams of timber, of segmental shape, about 6 feet long, framed together at a distance of about 2·6 with stout wooden bars. On the top of the oscillating cradle, the stone, measuring about four feet square by 2·6 high, was shifted by means of an inclined plane, and then, by means of levers and two or three blocks of stone, introduced one after the other under the cradle, the stone was raised and shifted on to the upper bed, the limit of height of the same being about 5 feet. This is the height established in the Great Pyramid, and the cradle is the inter-

pretation which M. Choisy puts on the description given by Herodotus, who says that the machine for raising the stones from one level to another was made of small pieces of wood. As Herodotus's description was given to him by the priests, it is the principle rather than the exact form taken by the machine on which, as M. Choisy suggests, we have to rely. On the other hand, the model in the British Museum is probably from 2,000 to 1,500 years later than the Great Pyramid, so that the methods employed in raising the blocks in the latter continued in use up to and probably including the Roman domination.

Up to the present day it has always been assumed that inclined planes formed the only scaffolding employed by the Egyptians; but M. Choisy points out that at Karnak, where the temples are planted so close one to the other, there would be no room for the immense extension of these inclined planes. He suggests, therefore, as an alternative, the temporary erection of a series of step-platforms similar to those which formed the actual kernel of the Great Pyramid, and he brings forward, in corroboration of his theory, photographs representing the remains of the temporary platform which was erected in the great court of Karnak in order to build the Pylon and the adjoining colonnade. These remains have usually been regarded as works of late date when those courts were taken possession of by squatters who settled in the precincts of the temple; but M. Choisy gives a photograph of one, and of the colonnade which adjoins the Pylon, and here one notes that the capitals of the columns still remain *en bloc*, and have never been worked down to their proper shape (*ravallés*). For some unknown reason the work was stopped and the colonnade was left unfinished. It is by minute observations of this kind that M. Choisy has been able to reveal to us the methods of construction employed by the Egyptians from the earliest times, and those to which we have drawn attention form a small portion only of his great treatise.

In the last pages of his work M. Choisy summarises the methods employed by other nations. Thus the prehistoric people who erected the menhirs and dolmens in various parts of England and at Carnac in Brittany worked according to the Egyptian method, as also the Phœnicians at Baalbec; and, following the sculptural representations in their bas-reliefs, the Assyrians.

The descriptions given in Vitruvius (x. 6) and Pliny (xxxvi. 21) suggest, according to M. Choisy, that the methods of construction in the Temple of Ephesus were only partially Egyptian, and at Selinus in Sicily he says nothing exists of Egyptian precedent.

The beauty and simplicity of M. Choisy's illustrative diagrams in the text have already been appreciated in his other works, but his photographic

reproductions are new and will be of inestimable value, not only as supporting his theories, but as records of Egyptian construction, most of which in course of time may possibly disappear.

R. PRENE SPIERS.

SHROPSHIRE CHURCHES.

An Architectural Account of the Churches of Shropshire. By the Rev. D. H. S. Cranage. Illustrated with Photographs by Martin J. Harding; and with Ground Plans of the most important Churches by W. Arthur Webb [A.]. Part 6. [Hobson & Co., Wellington, Shropshire, 1903.]

Mr. Cranage is nearing the completion of his monumental account of the churches of Shropshire, a work which leaves very little for any future architectural historian to add to. Everything noticeable about each church appears to be noticed, and all doubtful points of interest are discussed at adequate length. The descriptions of the buildings are full without becoming prosy, and instructive without being dogmatic. Mr. Cranage is not satisfied with merely recording the features and history of the subjects of his inquiry; he studies them also from the artistic point of view. He considers with a highly cultivated sense of discrimination what is worthy of being admired or the reverse in the work of every age. His open-mindedness and independence of fashionable prejudices are refreshing. The work of no one century is all sacred to him, nor that of another all accursed. The author shows a most happy temper in being able to speak even of things done in the nineteenth century without the incessant bitter railing which gives such an unpleasant as well as monotonous flavour to so much of our recent architectural literature. He has eyes ready to appreciate good work of every age; and, even when justice obliges him to blame results of uninstructed zeal, he is never uncharitable, but always willing to recognise that even what we most disapprove of now was done by men very like ourselves, doing their best according to their own lights.

The "plum" of the present volume is the very interesting church of Acton Burnell, attributed to Bishop Burnell, the great Minister of King Edward I., whose work at Wells is so well known. Among many others the churches of Condover, Alberbury, and the curious little Jacobean chapel at Langley may be mentioned. Everyone interested in the perennial question of the "low side window" should look up the drawings and description of what Mr. Cranage truly calls the very remarkable window of this kind at Church Preen. Mr. Webb's plans and details and the photographic views continue up to the standard of the former parts.

ARTHUR S. FLOWER.

THE ANCIENT CITY HALLS.

The Ancient Halls of the City Guilds, drawn in lithography by Thomas R. Way, with some account of the History of the Companies by Philip Norman, F.S.A. 4s. Lond. 1903. [Messrs. George Bell & Sons, York Street, Covent Garden, W.C.]

On putting down this book after a careful perusal one does so with a slight feeling of disappointment—at least that was my experience. On glancing at the title, and before opening it, I pictured to myself drawings which would at least have put on record the architectural beauties of some of the City halls in an architectural manner, accompanied by descriptions, more or less critical, of their variations in the style of building in vogue just after the Great Fire of London in 1666. Nearly all these ancient halls, as Mr. Norman says in his Introduction, were destroyed, either totally or in part, by this national calamity, and such claims as they have to be “ancient” date from that time.

The drawings themselves are excellent examples of Mr. Way's method of work in lithography, but one cannot help feeling that this method is more effective in suggestions of old bridges across the Thames, and for general sketchy effects in quaint streets, as shown in his drawings in *Architectural Remains of Richmond, Twickenham, &c.*, and in *Ancient Royal Palaces in and near London*, than in the present series, the subjects of which seem to demand a greater clearness in the details than is perhaps possible when executed in the process adopted. A general effect with a careful eye to the pictorial composition is what Mr. Way gives us, and he does this extremely well. In the view of the exterior of Cordwainers' Hall in Cannon Street, for instance, the whole is a charming street scene; but it would be difficult to say which of the buildings was Cordwainers' Hall unless one knew one's Cannon Street very well indeed.

In a book of this kind the letterpress is naturally written for the drawings instead of the drawings illustrating the letterpress. The architectural features are referred to in general terms, whilst a good deal of space is given to “worthies” of the various companies, with their gifts of plate, &c. The historical portion is put in a concise and interesting way, and if the book were a little smaller one could not do better than put it into one's pocket and read it in the quiet courtyards of the various halls whilst studying the buildings; and the drawings would come in excellently well as dreamy reminiscences to be called up after returning home, the studies for the day being ended.

I think Mr. Way is a little hard on the companies in his Preface when he says that there are but few of them who in recent years have resisted the temptation to rebuild their halls, giving over

the frontages to blocks of offices and banks. This is not accurate with regard to a good many of the companies at any rate. Where the halls are approached through courtyards, as they are in some cases, the halls are still there at the back, and the front buildings were probably stables or the clerks' residences on one side of the courtyard. The use for such buildings having disappeared, to replace them with more useful ones was hardly avaricious, but was the right thing to do.

The system of admission to the livery companies by apprenticeship has by no means died out, as is stated, although the apprentices, having promised to serve their masters faithfully, are not called upon to do more than pay an official visit to the Guildhall to have their names enrolled (and pay fees).

I notice a few inaccuracies on reading the chapter on the “Skinners' Hall.” This company does not rank sixth, as stated on p. 64, but alternatively sixth and seventh with the Merchant Taylors, as arranged by the Bilsden decree of 1484. Sir Robert Tichborne was no doubt a great man in his time, but he would hardly have presented a petition for the execution of Charles I. on his own account. What he did do was to present a “petition from London.” The amount spent on cedar for the cedar room in 1668 was £826, not £326, and the hall was not “almost rebuilt” in 1847–48. A good deal of so-called decorative work was done then, but the fabric was not interfered with.

These are, after all, small matters, and do not in the least deduct from the fact that Mr. Way has given us a series of very interesting drawings, and Mr. Norman a charmingly written epitome of some of the more prominent facts in the histories of some of the old City companies. When, however, will some devoted band of students set to work and make measured drawings of all these interesting buildings, with the dates of the various additions and “improvements” marked on them? How valuable such drawings would be for reference a hundred years hence!

W. CAMPBELL JONES.

PLUMBING.

Lectures to Plumbers. Second Series. Being a variety of Papers on Sanitary Fittings and their Fitting, Lead-work, Coffin Lining, Hydrostatics and Hydraulics, &c. By J. Wright Clarke. With 236 illustrations. 4s. Lond. 1903. [B. T. Batsford, 94, High Holborn, W.C.]

This collection of lectures covers a very wide field, albeit the subjects of which they treat are curiously varied and miscellaneous in order and selection. From the fact that each page is divided into two columns, it is probable that the volume under notice is a reprint only from the *Plumber and Decorator*, in which journal, we are told in the Preface, the lectures originally appeared. As

delivered by their author in the first instance, there was very likely no need or intention to follow any particular order, each one dealing with a distinct subject and being complete in itself. It is only when the series is contained under one cover that the desirability of a re-arrangement becomes evident. For instance, it would have been better if the three lectures treating of water-closet apparatus and soil pipes (Nos. 1, 4, and the last) had followed each other consecutively, and the second—devoted to "Lining and covering lead coffins"—placed at the end of the book.

The author is careful to explain that his mission does not involve the preaching of new doctrines—for the broad principles of sanitary science must ever remain constant—but rather the necessity of a full and intelligent appreciation of those truths which are demonstrably unalterable; and he is clearly right in insisting that by such knowledge alone it is possible to avoid at times serious error in our work.

Baths, wash-basins, sinks, milk dairies, household laundries, and much more connected with the plumber's craft are discussed in the various lectures, which are also illustrated—not always adequately, and sometimes poorly—with over two hundred diagrams.

The work also includes lectures on the physical properties of water, hydrostatics, &c., which should prove of value to those who are seriously desirous of acquiring an insight into the scientific aspect of plumbing.

Architects with a keen sense of the æsthetic properties of architecture will be grateful to Mr. Wright Clarke for the sympathy he extends to those who suffer from the unreasoning rigour of some of our by-laws. It is, however, often true that the by-law is less in fault than the official whose business it is to enforce its observance. The opportunities the law affords him, by virtue of his enormous discretionary powers, of displaying his mental vacuity are so fully taken advantage of that the spectacle has ceased to be strange. At the same time it must be admitted that he cannot always help himself, and these are the occasions when we find that the regulations them-

selves—especially in rural districts—are in direct conflict with common sense.

FREDERICK CHATTERTON.

MINUTES. VI.

At the Sixth General Meeting (Ordinary) of the Session 1903-1904, held Monday, 18th January 1904, at 8 p.m.—Present: Mr. John Slater, *Vice-President*, in the Chair, 25 Fellows (including 9 members of the Council), 30 Associates (including 2 members of the Council), 2 Hon. Associates, and visitors, the Minutes of the Meeting held 4th January 1903 [p. 140] having been read, Mr. G. A. T. Middleton [A.] raised a question as to the accuracy of the Minutes on the grounds (1) that it did not appear thereon that the Resolution moved by himself was seconded; (2) that the Resolution ultimately put from the Chair was not in the words of the amendment proposed by Mr. Macvicar Anderson [F.] and seconded by Mr. Hare [F.]. On the first point, on a suggestion of the Chairman, which was accepted by Mr. Middleton, the words "which was duly seconded" were inserted, so that the passage read: "Mr. G. A. T. Middleton formally moved the first Resolution, which was duly seconded, as above." As regards the second objection, the Chairman stated that the President, as Chairman of the Meeting in question, entirely endorsed the Minutes on this point as being a perfectly accurate record of what transpired. The Resolution, he ruled, was therefore valid, and no alteration thereof could be permitted. The Minutes as amended were then passed and signed as correct.

The Secretary announced the decease of Henry Saxon Snell, *Fellow*, and it was resolved that a vote of condolence be passed to the relatives of the deceased member and entered upon the Minutes of the Meeting.

The following Associates attending for the first time since their election were formally admitted and signed the Register, viz.: Ralph Scott Cockrill (Lowestoft) and Thomas Sedgwick Gregson.

The Secretary having read the Deed of Award of Prizes and Studentships 1904 made by the Council under the Common Seal [p. 158], the sealed envelopes bearing the mottoes of the successful competitors were opened and the names declared.

A Paper by Mr. J. Starkie Gardner on LEAD ARCHITECTURE having been read by the author, and illustrated by lantern slides, a discussion ensued, and a vote of thanks was passed to the author and responded to.

The proceedings then closed, and the Meeting separated at 10 p.m.



ADDRESS TO STUDENTS. Delivered by the President, Mr. ASTON WEBB, R.A., F.S.A.,
at the General Meeting, 1st February 1904.

BROTHER STUDENTS,—

FOR a second time it falls to my lot to address a few words to you on the occasion of the presentation of the prizes offered through this Institute.

Last year my subject was the importance of work for all intending to follow the art of architecture, and I was told by some that this doctrine was a little hard upon the young men, while, on the other hand, some students were kind enough to write me that they had found what I said encouraging and useful.

Still, though I do not believe for a moment that young men are afraid of hard work, I propose to-night to say something on the pleasures in connection with architecture, for I think there is no work in the world which has more pleasant by-paths and quiet resting-places than the art of architecture.

Of course the greatest pleasure of all is the pleasure of your work. If you do not feel this I advise you, as I did last year, to throw up architecture and take to something else before it is too late. Yet what pleasure can be greater than seeing the realisation of your ideas in brick and stone, even though your steps may be faltering and the result disappointing? If you can say with Tennyson, "Once in a golden hour I cast to earth a seed, Up there came a flower," then those golden hours will be your pleasure in life; few and far between they may be, but never to be forgotten when they come, and their memory will not fade.

Mr. Stopford Brooke, in closing his *Life of Browning*, describes him in words which perhaps you will allow me to quote, for they apply to an artist in stone as much as to one in words. He says of Browning, "No fear, no vanity, no lack of interest, no complaint of the world, no anger at criticism disturbed his soul. No laziness, no feebleness in effort injured his work, no desire for money, no faltering of aspiration, no surrender of art for the sake of fame or filthy lucre, no falseness to his ideal, no base pessimisms, no devotion to the false forms of beauty, no despair of man, no retreat from men into a world of sickly or vain beauty." And then, later on, he describes him as "Creative and therefore joyful, receptive and therefore thoughtful."

Then he continues, "Italy was his second country, in every city he had friends—friends, not only among men and women, but friends in every ancient wall, in every forest of pines, in every church and palace and town hall, in every painting that great art had wrought, in every storied market-place, in every great life which had adorned, honoured, and made romantic Italy."

What a vista of pleasures such a life suggests; and I venture to recommend to you young

men to take such an ideal as your standard and determine to live as near to it as you may. It all seems very high-flown and impossible, perhaps, at the moment, surrounded as you no doubt are, as we all are, by the petty cares, troubles, and drudgery of everyday life; but it is just because you are so surrounded that you should set your minds on something better, and you will come to find some good even in drudgery, as Carlyle found in the "common journey-work, well done for want of better."

One of the pleasures an architect should cultivate is reading—poetry of all sorts and kinds, romances, plays, and imaginative works generally. If you are to be creative you must also be receptive; you cannot always be giving out unless you are also taking in; and if you cultivate the habit of reading you will be able to get rest and refreshment from it, even at times of the greatest perplexity, anxiety, and even embarrassment. But you must acquire the habit while you are young, and it will enable you in the future to transplant yourself for an hour or two, at will, into an enchanted land, where builders cease from troubling and even your clients (or your desire for them) will be at rest.

Another of your pleasures will be the study of painting and sculpture (modern and antique). Alfred Stevens, sculptor, painter, and architect, used to say, "I know but one art;" and if you are wise you will know but one, and train yourself accordingly.

And now, what are the other pleasures of an architect's life that may be indulged in, with advantage to himself and his art? I will name a few, though you already know them well; and in naming them I do not suppose you can entertain them all. Still, you may acquire a nodding acquaintance with many of them; though, if you do, kind friends will probably remind you of the proverb, "Jack of all trades, master of none;" but there is a much wiser proverb than that, "Know a little of everything and everything of something." Follow that and you will be a well-equipped man, and that alone will be one of your greatest pleasures in life.

Travel is another of the pleasures that naturally appeal to an architect. You may go round the world or over Europe, or through England, though this costs money, and perhaps that is not a plentiful article with you. Well, then, you have plenty of scope in London alone, which need not cost anything to those who live here. Sir Lawrence Alma-Tadema gave a needed hint last year to those about to travel, not to go abroad till they knew something of their own country and their own city. Here in London we have two of the finest Gothic and Renaissance churches in the world, a series of Renaissance parish churches unequalled anywhere, and a wealth of domestic and commercial buildings, ancient and modern, that would take a man's life to know. A friend of mine, an architect, has hardly been out of England all his life, and I verily believe his art is the better for it; yet how few study what is at their doors. "For thus 'twas ever, things within our ken owl-like we blink at, and direct our search to farthest Inde, in quest of novelties."

To enjoy travel properly you must, of course, sketch and draw a little. In my day we used to make water-colour sketches, which had no value as pictures and still less as architectural records; but the making of them was and still is to some of us a distinct and harmless pleasure, not to be overlooked but enjoyed in moderation. The same pleasure can, I think, be got from pencil sketching, with a few of the leading dimensions added, and, though such sketches cannot be *framed*, they will be *useful*, which is far more important. The true value of all sketching is to enable the student to arrive first at the end the artist aimed at, and then to discover the means he employed; apart from this all the pretty draughtsmanship we see is quite thrown away. Still, sketching will always remain, however pursued, one of the recreations of an architect's life. Painting is not for him, except of course a general knowledge of painting and sculpture—enough to enable him to form an opinion of good and bad, and to

distinguish the works of different masters by their various methods; and no man should think of going to Italy without first mastering to some extent our great collection in Trafalgar Square.

Then there is archæology—a good servant but a bad master. We have allowed it to be our master for close on a century, and in return it has well-nigh strangled all the life out of us, so that we dare not call our style our own. The other day I was asked to write my opinions on what is called "*l'Art Nouveau*." I was obliged to decline; but had I done so, I should have said that, though no admirer of that particular phase of art expression, I welcome almost any effort to break through the paralysing trammels in which archæology has bound so much of our work. Still, what greater pleasure can there be than to stay in a country village and trace the growth and history of its parish church, to study the Norman beginning, the various extensions from time to time for increased accommodation or display, the Founder's tomb with his genealogy and heraldry, perhaps the matrix of a brass and the disfigured font, the occasional floor tile and the oft-deciphered fresco, all making an ideal holiday and an unadulterated pleasure; only, I must add, you had better leave it at that, and not attempt to reproduce what is not reproducible.

Then there are what I may call the somewhat sterner pleasures, such as the study of geology and chemistry. Unless you have had your thoughts directed to these at school you are hardly likely to take them up afterwards; but if you have, you will do well to keep in touch with them. The cliffs and the hills will be of more interest to you for the one, and all life for the other, and the materials with which you build for both.

Music, if you are gifted that way, will give you endless pleasure, if not apparently in very direct connection with your work; yet there may be more relation between the harmonies of sound and the harmonies of proportion than are at present dreamt of in our philosophy.

Another pleasure of a very different kind is that of criticising—not the pleasure of being criticised; that is a chastening ordeal good no doubt for all of us (and one which is never lacking); not the friendly criticism, however severe, among ourselves of each other's work, which is natural, improving, and proper; not the friendly and informing criticism, such as we shall no doubt hear from Mr. Gibson to-night; but the pleasure it gives to some to find fault—to set up for themselves some almost impossible preconceived ideal of perfection, and then to hold up a building to scorn and reproach because it has not reached this ideal. Be as severe a critic as you like of your own work, and never allow yourself to be fully contented with it; but if I were you, I should leave criticism of this sort as much as possible alone. It is no doubt a duty which some feel bound for the good of their fellow-countrymen to undertake, and useful it no doubt is; but remember what the old Don said to his students: "Everyone may be mistaken sometimes, even the youngest of us." You will find, I think, more real pleasure in the admiration of noble things and fine design than in the criticism of even mean and inferior work.

Perhaps one of the greatest pleasures our work offers to us is the opportunity and pleasure of friendship. Our branch of art is essentially associative. It is conceivable a man may paint a picture or carve a statue in the loneliness of his studio, unassisted by his fellow-man, and, as a fact, many painters take pride that they do this, and that their work is that of their own unaided hands. With us it can never be so, and we must cultivate sociability, and be able to rub shoulders and associate with all members of our craft. A policy of splendid isolation is least of all suited to an architect amongst artists. You will, if you are wise, be friends with all whom you employ. You will get better work from an intelligent mason by a little friendly chat with him, than with all your stringent clauses in specification and conditions of contract.

Some people seem to think an architect is a sort of detective set over the men to watch them, and would be horrified to see their architect on friendly terms with those they employ; but such people are not those that are best served, or get the best work done in the end.

The architect should rather be in the position of the general selecting his lieutenants to assist him in the work, and enjoying the full confidence of his men; they should be proud and pleased to see him on the work, anxious he should see what they are doing, knowing he will praise where praise is due, and blame only where blame is necessary. This may sound to you a little Utopian, but it should not do so. If it is there is something wrong somewhere, and it is for you young men to help to set it right.

Then the pleasure of friendship with your brother-architects is one that may last your life or theirs. Our meetings here, and at the Architectural Association, offer the opportunity of sowing the seed, which can be strengthened in numberless ways. For myself, I have always been a member of one or more small coteries that meet periodically at each other's houses, and they have always been red-letter days to me. In London, personal competition is rarely so keen that the most strenuous life need be the cause of losing friends.

I have heard that the late William Burges used to say, the happiest moment in an architect's life was when he received notice that he had won a competition, and before the troubles and anxieties of carrying it out had come upon him. But I would not myself lay too much stress on this, for there is also from time to time, to the man who competes, the counterbalancing depression caused by the receipt of a communication of a different kind. At the same time, I may be allowed to say that some of my happiest times have been passed in working out large competition problems with my friend Mr. Ingress Bell, and I have found there is real pleasure attending on such work.

And now I have left the greatest pleasure of all to the last, the pleasure we may legitimately feel in going over our completed building, in which we have done our level best, with all the skill which we have been able to bring to bear upon it—no detail ill-considered, no requirement overlooked; perfect it cannot be, but if it is as perfect as we can make it we may legitimately be proud of it and honestly pleased at its completion. What more touching picture than the aged Christopher spending each birthday, after the completion of St. Paul's, under its mighty dome? You may be sure that was one of his greatest pleasures in later life, and one he could not have enjoyed had he not known he had done his best.

It is for us older men to see visions—visions of what might have been. It is for you younger men to dream dreams—dreams of what may be. Perhaps some of you are workers who dream no dreams. Well, do not despise those who do; both are required in the world—in our world especially—the dreamer and the practical man. Once in a way, but very rarely, they are found in one man, and then we have the rarest of all products, the Genius, like Christopher Wren, or Tennyson, who, when over eighty, sent his last message to young men—

O young Mariner,
Down to the haven,
Call your companions,
Launch your vessel,
And, crowd your canvas,
And ere it vanishes
Over the margin,
After it, follow it,
Follow The Gleam.

And now I have very imperfectly jotted down, amid a variety of occupations and distractions, some of the pleasures that may come into our lives if we will; it is pleasant for

a moment to dwell upon them and to leave dull care behind. Such are the things that will help to make us sing at our work and enjoy it, and so make others enjoy it. You and I will not stand here face to face again, as we do to-night, and so I am glad my last words are not of faction, of disputes and controversy, but of the pleasant side of our art.

I am well aware I have said nothing of that all-important matter Design. I have refrained from doing so, because I believe, with William Burges, that this is a direct gift given to each of us, in a more or less degree, and there is, therefore, no good in talking any more about it; but, in wishing you all farewell, I also wish you every success in the future.

Some of you will, I doubt not, occupy this chair in due course, and be as surprised to find yourselves here as I have been; but whatever may be in store for you, determine you will hold high the standard of our art, and keep your shield bright so that you may stand before the world and be not ashamed.

REVIEW OF THE WORKS SUBMITTED FOR THE PRIZES AND STUDENTSHIPS 1904. By JAMES S. GIBSON [F].

Read at the General Meeting of the Royal Institute, 1st February 1904.

THE value of any real criticism lies in the impartial and judicious attitude of the critic towards the work, and it shall be my endeavour to waive any personal preferences or prejudices and treat the subjects in a broad and liberal manner. The usefulness of the criticism lies in the openness of mind of those criticised to allow the resulting reasons and decisions of the critic to influence their work and methods, so that improvement may come; and I am sure you, as students, will not shut out of your mind anything I may have to say simply because it does not happen to coincide with the views you now hold.

THE ESSAYS.

Before dealing with the drawings and designs let me say a few words on the Essay, for which, unfortunately, no work has been submitted this year of sufficient merit to obtain the award.

Repeated attempts have been made of recent years to get a good response for the Essay Medal, and this year eight competitors entered the lists; and it is disappointing to think that not one of those had sufficient grasp of the subject or literary style to obtain the prize, which I am confident would not be withheld by the Council without just cause.

Now, the value of expressing oneself clearly in good, terse language is of great moment to you as architects, and the habit of putting in writing your ideas, desires, and conclusions is certainly one you should cultivate. You need not think that you have to be a Ruskin in your command and mastery of language to obtain this prize: literary style and finish are no doubt essential, but the cultivation of style will in itself be a pleasure and bring its own reward. To those who are ambitious—and surely ambition courses through the veins of youth—there is an incentive in knowing that the name of one of the foremost novelists of our time, Thomas Hardy, will be found on our scroll as prize essayist for the year 1862.

In taking leave of this subject, let me say, as one who has had some experience on the Prizes Committee, that we find the greatest difficulty in obtaining subjects for the Essay and also for the Designs—subjects which shall be broad, likely to appeal to a great number, and of value to the whole profession. I am sure the Committee would gladly welcome suggestions

of subjects for future prizes, and if you have any ideas send them in at once for our consideration. Remember that anything in the nature of specialisation is to be avoided.

Now let us turn to the Drawings. I propose to review these in the order of their educational sequence or value, taking first the Measured Drawings, the Pugin Studentship, and the Owen Jones Studentship, as studies of old work upon which architectural knowledge is based; secondly, the Grissell Medal, as design governed by construction; and lastly, the Tite and Soane Prizes, as designs which show the fruition of the first two groups. I think if students entered for these prizes in the order I have named they would be going through an educational experience which would be of great value to them and likely to lead to beneficial results.

THE MEASURED DRAWINGS.

The Measured Drawings have attracted twelve competitors, and the Medal goes to Mr. L. M. Gotch for a creditable set of drawings of the Church of St. Oswald, Ashbourne, Derbyshire. The one-eighth scale drawings are all good: clear records of an interesting work, carefully rendered—just what we have a right to expect in measured work. The half-inch scale is very weak in freehand drawing, of which there is very little in this set; and in this respect it falls below both the sets distinguished by Honourable Mention. The full-size sections are unsympathetically drawn; there is too much compass work about them. Remember that T-square and compass drawing is the most elementary kind of drawing and easily acquired. All students would do well in their full sizes to make it quite clear which is the section side of their mouldings, as several of those submitted would read equally well either side, and I would suggest a flick of the brush occasionally on the inside of the moulding, or a thick and thin section. You may find it very annoying in after life to have, for example, your plaster cornices run the reverse way of the moulding because you have not made it absolutely clear which side of your drawing you wanted the mould cut to fit.

The half-inch details of tracery windows submitted by Mr. G. S. Salomons are beautifully drawn and deserving of commendation.

THE PUGIN STUDENTSHIP.

We now pass to the Pugin Studentship, which has only attracted three competitors, of whom one is not important enough to justify serious criticism. The Medal is awarded to Mr. F. C. Mears for a comprehensive set of drawings of rather unequal merit. The coloured sketches are sadly lacking in clearness and vigour, and do not express the character of the work. The measured drawings are very good, and those of Pershore Abbey are particularly fine. The pencil and wash drawings are much better than the coloured work, and show sympathy with the mediæval architecture—work which this Studentship was founded to foster—and I have no doubt the student will greatly benefit by his further studies of it. A Medal of Merit has been awarded to Mr. W. S. A. Gordon for his well-chosen subjects and sympathetically drawn work. The pencil drawings are among the finest ever submitted in this competition.

THE OWEN JONES STUDENTSHIP.

The Owen Jones Studentship is awarded to Mr. W. Davidson as the best of the five competitors. The drawings show a certain facility in handling watercolours and an ability to draw the figure, more than an appreciation of architecture decoratively treated with colour, of which there is no good example among his exhibits.

I would especially direct the attention of students to the unwise practice of late years to

show examples of marble and mosaic floors and wall linings of elaborate geometrical patterns, which apparently entail an enormous amount of purely mechanical drawing to portray, the artistic results of which are so limited in scope and value. This is especially seen in the prize-winner's sheet of floors and friezes and Mr. L. Rome Guthrie's sheet of marble floors. The endeavour of the student should be concentrated on getting a grasp of the motive that underlies the decorative scheme of any building, the basis upon which the scheme is founded.

A note of the detail of a floor or a frieze which is almost entirely geometrical and mechanical in the repetition of its parts is quite enough if the note be a true one as to colour and form.

To illustrate my meaning clearly I think the drawings of the Mihrab in the Mosque at Cordova, and the Capello Palatina, Palermo, are splendid specimens of the type of drawing which this Studentship was founded to encourage. They show the application of colour decoration to architecture in the sense understood by Owen Jones. Those drawings have no tone or atmosphere, although these are the qualities which play the most important part in the colour scheme of any decorated building; but they show the form and colour of the ornament, which used on the building produce the results we all admire. They are really an analysis of the colour scheme, and are valuable on that account. A Turner or a Roberts could give us the tone and atmosphere of these buildings, but we could not deduce from their paintings the means by which the effect is obtained.

The watercolour sketches submitted by Mr. H. Morley are an attempt to depict the tone and effect of buildings and landscapes, but they are not very successful as such; and certainly do not bear any relation to the purposes for which the Studentship was instituted. His drawings of purely architectural detail, such as the "full sizes of a painted altar-piece," are feeble in the extreme.

I would strongly urge students to concentrate their energies on architecture decorated with colour, to portray examples of church roofs, arcades, walls, and domes; they will find the work just as interesting as doing a few scraps of glass or mosaic or tiles, and they will be better equipped to deal with the decoration of their own buildings. They will thus be able to dispense with about one-half of the drawings now sent in, and the Council will be much better able to judge if the winner is likely to benefit from the further study which the Studentship affords.

THE GRISSSELL MEDAL.

We have finished the first part of our subject, and now come to the application of what we have learned, and the Grissell Medal comes first, in that it was founded for the encouragement of construction as governing design. The timber spire or lantern has attracted fourteen competitors, and Mr. W. Hepburn comes easily first. The design is an excellent one, clever in inception, splendidly drawn, and carefully worked out in all its details.

The problem is one in carpentry, and one which has been solved by the old carpenters who worked on our mediæval cathedrals in many beautiful and interesting ways, and I think as an exercise it should be worked out logically in the same fashion, and not have rolled steel joists and concrete floors introduced into its solution, as is done by some other competitors. I do not mean for a moment that we should discard the modern steel joists and other inventions, but rather that an exercise in carpentry should be worked out in carpentry, and one in stone worked out in that material. There are few things more inspiring than the grand old roofs and lanterns of the carpenters who knew the capabilities and value of their splendid material. With the exception of the first design, the draughtsmanship of the others is hardly up to the standard one would expect.

THE TITE PRIZE.

The Tite Prize begins our list of designs pure and simple, although one cannot say they are either simple or pure designs.

The subject of "A Crescent in a Large City" is an exceedingly attractive one, and I am glad to see eleven entrants, all of them being creditable efforts, and some of considerable merit.

The Prize is awarded to Mr. Heaton Comyn for a nicely proportioned scheme, thoroughly well thought out and capitally drawn. We expect to find in this and the Soane competition grouping of masses, architectural arrangement, good proportion of the various parts, balance of solids and voids, and refined detail, and I am sure the author of the winning design has an appreciation of these qualities. The arches spanning the two streets are open to criticism in that the haunches appear to be too weak, and this same defect is to be found in other designs. The competitors should study Waterloo and London Bridges and see what value is to be obtained by having deep voussours at the haunches of the arch. The half-inch detail is nicely drawn, although I am inclined to think the work is too delicate for a street façade on a big scale. The Medal of Merit awarded to Mr. A. D. Nicholson was probably given for his capital watercolour. The proportions of his design are good, but the detail is coarse and not well drawn. "Red Shield" has a fine set of drawings, the half-inch detail being especially good, but the proportions of the upper and lower parts of his design are too equal.

THE SOANE MEDALLION.

The Soane Medallion has brought forth fourteen competitors of very varied capacities. Some of the drawings are of considerable merit. The Medallion has been awarded to Mr. F. J. Horth, whose scheme is on the whole the most coherent and satisfactory. The plan is laid out on sound architectural lines, well proportioned and balanced. The interior is also simple in its parts, nicely built up, the exterior perhaps being the least satisfactory part of the design. The interior eye to the dome is very badly managed, and wants some supporting ribs or other means of bringing it into relation with the rest of the work. The detail wants refinement, and the drawing is hardly up to the standard one has reason to expect in our premier competition. Mr. David Smith secures honourable mention for a really nicely conceived exterior the component parts of which are good, and the general effect is perhaps the best of all the designs. The plan and interior are, however, not up to the same level. It is a great pity that the inspiration of the exterior failed when the plan and interior were fashioned. The drawings are rather slight and lacking in decision and clearness, but they are worthy of the distinction. "Rotunda" sends a restless design, lacking the dignity and reserve which the subject demands. The drawings are probably the best of their kind submitted this year, the interior view being especially good; but even here the author has succumbed to his weakness for flamboyant detail. "Sanctus Boscus" sends a fine dignified interior which is wedded to an almost impossible plan.

My duties as critic are now ended. I hope that I have not wounded the feelings of any who have laboured in these various competitions, and I would like to conclude by saying to you, as a fellow-student, the chief reward of labour may not always be a prize. Who knows but that the efforts made in striving to obtain the prize may have awakened feelings and aspirations which will bear fruit far greater than the victor's laurels? While to those who have succeeded in this friendly tournament of skill let me say, Use your successes as stepping-stones to higher achievements.



9, CONDUIT STREET, LONDON, W., 6th Feb. 1904.

CHRONICLE.

The Prizes and Studentships 1904.

The Annual Exhibition of the works submitted in competition for the Prizes and Studentships in the gift of the Institute opened at the Gallery of the Alpine Club on Tuesday the 19th ult., and closed on Saturday the 30th. The visitors' book showed 1,398 signatures—over a hundred and fifty more than last year. The number of competitors was seventy-three, as against sixty-nine last year; number of strainers 321, as against 355 last year. The drawings done by the Travelling Students, Messrs. Fulton, Gascoyne, and Gibbons, were hung in the Meeting-room on the occasion of the Presentation of Prizes on the 1st inst., when they were referred to by the President in his remarks reported below.

The Annual Addresses to Students.

As on the last occasion of his addressing the Students, the text of the President's Address as prepared for and now printed in the JOURNAL formed only part of his remarks actually delivered at the meeting. Amongst other interpolations unhappily not taken down by the reporter were reminiscences of his own days of pupilage, when it was customary to serve five instead of three years, and when some of the duties which fell to the lot of the pupil, if they were not without their compensations to the youth at the moment, could scarcely be recommended as an ideal system of education for the career of an architect.

Mr. Gibson was unable to be present to deliver his Criticism of the Students' Drawings. A telegram from him was handed in at the last moment, stating that he was detained at Walsall and could not reach the meeting in time; and his remarks, which were already in print, were read by the Secretary.

The following is a note of the speeches made on the Vote of Thanks:—

MR. W. GOSCOMBE JOHN, A.R.A., said he was present as a guest that evening—a sculptor guest. Sculptors frequently found themselves the guests

of architects, but still more frequently Sculpture found itself the guest of Architecture. The pleasures of Architecture were, perhaps, to all lovers of art, the most common; those of painting and of sculpture were much more limited. Wherever one went, wherever one travelled, however obscure the place, however tiny the village, one always found something in Architecture of interest—a tiny church, a tiny cottage—there was invariably something to interest one's critical or one's archaeological faculties. This was not so with sculpture and painting, therefore to artists generally there was no art so vitally interesting as architecture—particularly to the sculptor. Speaking personally, he was brought up a good deal under the influence of architecture. The President had mentioned the late William Burges, whom he (the speaker) had, as a boy, the privilege of knowing, and he received much helpful encouragement and advice from him. William Burges was, too, of all men the most inspiring of workers. The speaker concluded by asking the Meeting to join him in a very hearty vote of thanks to the President for his very delightful address.

MR. W. D. CAROE, M.A., F.S.A. [F.], said he rose with very great pleasure to second the Vote of Thanks. At the outset, however, he could not help expressing a slight note of sadness on hearing from the President that this was the last Address he would give from the Presidential Chair. It had been a great pleasure to him, and he was sure to every member of the Institute, to see Mr. Aston Webb in that chair, and it would be an equal regret to them should he vacate it without serving, as they all wished he would do, the third year of office which they, in perhaps rather a selfish way, regarded as the mood to be offered to Presidents who distinguished themselves as Mr. Webb had done. He was sure that no happier words could have been spoken than those used by the President that evening in pointing out to them, as students, the pleasures of the great profession they all did the best they could to adorn. He had often felt that there was no side of architecture which the public knew less about, which even among themselves was not acknowledged as it might be, than the joy which their work brought to them; and it was indeed a happy inspiration of the President to dwell in his last address upon the pleasures and sweetnesses of their art. It would be difficult for him to supplement the list of the architect's pleasures which the President had given them; but he should like to mention the extraordinary joy experienced by the architect, not only in contemplating his completed work, but in actually being present on the building and seeing it grow. Speaking for himself, that was the greatest pleasure architecture afforded him. He had often wished that the whole tenour of the methods of their profession could be altered,

and that it could be a self-denying ordinance amongst architects that they should carry on only one work at a time, and be present on the building the whole time of its erection. To watch brick placed upon brick and stone upon stone brought to the architect a pleasure which very few other callings could boast of. In conclusion, he thanked the President most heartily, and he was sure the meeting would join with him, for the kindly words he had addressed to them, and the charming thoughts he had put before them.

The PRESIDENT in responding on his own and Mr. Gibson's behalf, said that Mr. Gibson had given them a most admirable review of the works exhibited. He (the President) had had this task to do himself, and he knew how difficult it was—that is to say, to do it truly and honestly as it ought to be done, and yet without hurting the feelings of those whose drawings were criticised. Mr. Gibson had hit the happy medium exactly, and had fairly, and in a kindly spirit, criticised the various works. He was sure it was their wish that their thanks should be conveyed to him for his valuable contribution to their proceedings (*hear, hear, and loud applause*).

Before presenting the Prizes the President called attention to the work on the walls done by past Students. One side of the room was hung entirely with drawings the outcome of Mr. J. B. Fulton's travels as Soane Medallist 1902. They would be found, said the President, a very beautiful set; and, numerous as they were, they represented only about a half of the studies actually made. Mr. Fulton had asked permission to defer sending in his work for the present in order that the whole collection might be shown together at a later period. This, however, the Council might not be in a position to arrange, so it was thought better to conform to the rules and show what they could of his work on the present occasion. On the opposite wall were some excellent drawings by Mr. Charles Gascoyne, *Title Prizeman* 1902, which would well repay examination. Mr. Gascoyne, observed the President, was evidently a colourist, and knew where to go for his studies. He, however, had not devoted himself entirely to the brush but had done measured work as well. There were also drawings by Mr. Harold Gibbons, the result of his Pugin tour of 1903. Thus, concluded the President, it would be seen that their Prizes and Studentships resulted in good work, and the Institute was able to afford opportunities to young men which otherwise they would not have. The President then distributed the Prizes as noted on the Minutes.

Mr. Saxon Snell's Bequest to the Institute.

At the Meeting last Monday the following extracts from a letter to the Secretary from Mr. A. Saxon Snell [*P.*] were read by the Secretary:—

"I beg also to acknowledge your letter of 20th inst., and on behalf of my mother and the family generally, return thanks for the very kind vote of condolence with us in our loss, passed at the meeting on 18th inst., and to assure you that we much appreciate this evidence of the respect in which my father was held by the members of the Institute, of whom he was one for so many years.

"It is my privilege to inform you that under the terms of his will a sum of £750 will in due course be handed to the Institute for the institution and maintenance of a special triennial Scholarship. Later, I will forward the precise terms of this bequest."

The PRESIDENT said he was sure every member of the Institute would be grateful to Mr. Snell for the donation he had left by will towards the encouragement of architecture and the education in architecture of their young men. Later on, when particulars of the bequest were received, a scheme would no doubt be laid before them and they would pass a formal vote of thanks to Mr. Snell, the son, for the communication he had sent them.

The new Director of National Museums, France.

M. Homolle [*Hon. Corr. M.*] has been appointed Director of National Museums and of the School of the Louvre—one of the most coveted posts, and perhaps the most responsible, at the disposal of the French Minister of Public Instruction. M. Kaempfen, who is retiring in his seventy-eighth year, has held the office since 1887. M. Homolle is fifty-four years of age. His excavations at Delos first drew the attention of the learned world to him; and the treatises to which he committed the results of his labours there revealed the gifted writer as well as the archaeologist. To this double merit he owed his election in 1892 to the Académie des Inscriptions et Belles-lettres, and two years later his Directorship of the French School at Athens. Of his brilliant work at Delphi members had specially favoured means of judging a few weeks ago, when the distinguished explorer himself built up before them in the Institute Meeting-room the exquisite monument the Treasury of Cnidos, and discussed its relationship to the art of Ionia. The University of Cambridge has since conferred upon him the honorary degree of Doctor of Letters. The French Government is to be congratulated upon the wisdom of this selection.

The Société Centrale des Architectes Français.

M. Constant Moyaux [*Hon. Corr. M.*], who has completed his three years as President of the Société Centrale des Architectes Français, has retired from the office, and is succeeded by the eminent architect of the Sorbonne, M. H.-P. Nénot, Member of the Institut de France.

REVIEWS.

TRAVELLERS' JOY.

Stray Studies. Second Series. By John Richard Green. 8s. Lond. 1903. Price 4s. net. [Macmillan & Co.]

We architects sometimes wonder, not wholly in arrogance, what is the pleasure of foreign travel to the man of unarchitectural mind. Such a book as Green's *Stray Studies* gives at once an answer to our question and a justification for the feeling which prompts it. The answer is, that the historian has an equipment for the enjoyment of pilgrimage no less efficient than that of the architect, and the justification for our seemingly proud question is that the very historian cannot work out his pleasure without reading the documents which are the products of our ancient craft, nor can he read those documents without understanding them. We are then not entirely vain in our pride. The historian is the only serious rival of the architect in this enjoyment of travel, and his rivalry only thrives by the actual sharing of our panoply.

In talking thus I am, of course, wilfully ignoring whole tribes of so-called travellers. There are thousands of our fellow mortals who go, poor things, to the Riviera to miss London fogs, to Homburg to baffle gout, to Monaco to lose their money, or perhaps to the Alps to lose their lives. There are people who go from Balham to the Baltic because ten other people from Balham are going in the same ship, and there are those who, finding themselves unpopular among their home neighbours, lie to Jericho in a steam yacht with the invincible intention of making friends *en route*.

All these, justly or unjustly, I leave out of my present consideration of the pleasures of travel; I leave out, too, those travellers—honourable and courageous though they be—whose goal is in the region of remote savagery, for I am here choosing to mean by "the pleasures of travel" those excitements of the cultivated mind which arise from personal association with the scenes of bygone civilisation. In fact, I put a limit on the subject by confining it to its most illimitable sense.

One man, indeed, I have forgotten, who must be admitted to voyage in equal happiness with the architect and the historian, a kindred man—the student of painting and sculpture.

The book we have before us, though new in publication, is old in the writing. The articles, of which there are twenty-seven, are reprints from the *Saturday Review* of some thirty years ago. Not all of them deal with buildings and places, some are concerned with those economic and social questions which vex Britain now as they did then, others are purely historical or ethnological; but all are full of those human interests which touch architects as they touch other men,

and three or four are so distinctly written from the point of view of the architectural *savant* that there can be no impropriety in their coming under the notice of this journal.

You, Sir, and you among my readers who have made pause at Como on your happy outward way to Venice, Florence, or Rome, have ascended, no doubt, that stiff little Monte Baradello which gives so fair a view as a reward to the climber. Generally one has no wish to find a fellow-countryman in such a spot.

"Beneath is spread, like a green sea,
The waveless plain of Lombardy;
Bounded by the vaporous air,
Islanded by cities fair,"

and the hour, in which a man quotes these lines of Shelley for the first time on his own account, risks its perfection if spent in the company of the chance man-on-the-summit, that inevitable forerunner who is so often the preoccupied of the ground that should be a solitude. But after reading the essay on Como, which comes fourth in this volume, you will probably agree in thinking well of the fortune which should decree the fortuitous stranger to be John Richard Green. You would, perhaps, have joined him in a silent search along the horizon till a sun-gleam in the distance lit up for you the "great marble mass" for which his eyes and yours were looking; and then some remark of his offering a criticism upon the building, to which the British tourist gives unblurred adoration, would show you that you were dealing with one who had the power of right judgment, and turning with him to the Como side of the hill, you would have discussed the Lombard dignity of San Fedele whose "deep exterior galleries recall the German churches along the Rhine, and that small but most graceful creation of the eleventh century the Church of Sant' Abbondio."

"The duomo," he tells you, "is disappointing, with the notable exception of the west front, which is a fine specimen of late Italian Gothic"; and you would rejoin by bidding him not overlook the superb quattro-canto work of the south door, which is attributed to Bramante, and which bears upon its tympanum a memorable "Flight into Egypt."

Then would he tell you more about the history of the place than you are likely to have cared to read in your guide-book; more, indeed, than your guide-book had to tell.

He would make Frederick Barbarossa a reality for you, and would give you to understand that the Broletto, which had been the subject of your morning's sketch, was not merely a thing of architectural beauty but a symbol of the "new popular life which sprang from the Italian town masses of the eleventh century, and of the new eloquence which sprang from the Italian communes."

And then, somehow, in the course of a talk in which he has spoken of such diverse but kindred themes as British freedom, Luini's frescoes, St. Edmundsbury, Garibaldi, and Victor Hugo, and in which you, perhaps, have added a contribution on Merzario and his engaging Comacines—who may or may not be the mainspring of all mediæval art—you have slipped back in chronology to a mention of Pliny, and your companion has held forth the suggestion that since Pliny's day Como has made but little contribution to letters.

This gave you your chance, I think, for a reminder of Cesare Ciserano, and you put a little pardonable warmth into your eulogy of the great Vitruvius that came from the Como press of Gotardo da Ponte. Your new friend rejoined, no doubt, that the prose of Cæsar Casarianus, who latinised his Italian as much as he latinised his own name, was not fit to be put alongside of the world-renowned epistles. But to this, as you went together down the hill, you answered a word to the effect that if the function of literature has to do with the making of beautiful books, this sixteenth century folio of fair print and incomparable woodcuts was at least fit to rank, to Como's credit, as a bit of literary output. You added something, no doubt, about your own copy, bought dirt cheap for cinquanta lire in Rome, and bound in the parchment of a plainsong "Magnificat," till, talking of books and nations, buildings and dead princes, you came at length to the welcoming inn whose name recalls yet another Comacine, the modern (but how ancient) Volta of electric fame.

But you never did meet John Richard Green on the hill-top. Nor did I; and to-day it is twenty years since he died.

I could wish there had been more of these place studies. A book full of them would rank with Symonds's *Sketches in Italy*, or with Bourget's *Sensations*. Such writing is no mere literary scrap-meat. To group a set of historical thoughts or a chain of artistic chronicles around the place to which they belong is no idle gratification of the palate that refuses stronger and longer reading. It is not for nothing that the aroma of history hangs on the spot where human influences and passions were wrought into events, and even if there were nothing to be gained from the breath of this haunting *genius loci*, the mere fact that a traveller cannot take Gibbon and Vasari, or even a classical dictionary, on his pilgrimage, authorises the existence of these monographs of place.

I chose the Como sketch at random from the volume. In some ways it is the prettiest, but there are others as good. The chapter on the Château Gaillard, that "Saucy Castle" which our Richard of the Lion-heart raised as the rampart of Normandy, is equally picturesque.

Perhaps it is natural that Green's writing on this sturdy ruin should have a little of Turner's touch about it, and his few words about Turner's

work show how true a critic he was of method in art as well as of historical influences. "At the first sight of it, indeed, Turner's sketches seem to be wild exaggerations, and it is only the long, stiff pull up to the ruins and the sight of the Petit Andely right at our feet with its brown lines of roofs, its wooden gables, and its little dwarf *fleche*, dwarfed into a toy town by the height, that teaches us how much truer a great painter's eye is likely to be than our own." There never was written a neater defence of Turner. Think of its needing an historian to tell us that Turner had got the "stiff pull up" into his brush-work! This is art criticism in *excelsis*. Green's prose sketch of Rochester and its castle is a water-colour in words. I will not quote it here. I will only say that it is a perfectly quiet description, simple but strangely impressionist.

Of the other subjects that will appeal directly to architects and lovers of architecture, I must mention a paper on Troyes, another on St. Edmundsbury, and a third on Knoke. They all have the qualities of vivid historical insight and acute appreciation of architectural beauty. How true it is that architecture is history's brother, and if it be the case that Green's historical writing is made definitely more attractive by his love and knowledge of buildings, is it not a melancholy corollary that we architects sometimes lose half the pleasure that we might have in our own art by the gaps of nescience in our historical armour?

PAUL WATERHOUSE.

NOTES, QUERIES, ETC.

Lead Architecture: Nonsuch Palace and Stucco Duro.

From R. PHENÉ SPIERS, F.S.A. [F.]—

In a Paper read by Sir Digby Wyatt before the Institute on 18th May 1868, on "The Foreign Artists employed in England during the Sixteenth Century, and their Influence on British Art," the clearest evidence is given not only as to the name of the artist (Toto dell Nunziata) who was employed in the design of the Palace of Nonsuch, and the modelling of its bas-reliefs, but as to the material in which the latter were made. Evelyn, as quoted by Sir Digby Wyatt, refers to "the plaster statues and bas-relievs inserted 'twixt the timbers and punchions of the outside walls of the court which must needs have been the work of some celebrated Italian. I much admired how it lasted so well and intire since the time of Henry VIII., exposed as they are to the air, and pity it is they are not taken out and preserved in some dry place—a gallery would become them. There are some mezzo-relievs as big as the life. The story is of the heathen gods, emblems, compartments, &c. The palace consists of two courts, of which the first is of stone, castle-like (built in the reign

of Elizabeth), by the Lord Lumley; the other of timber, a Gothic fabric, but these walls incomparably beautified. I observed that the appearing timber punchions, entrellices, &c., were all so covered with scales of slate, that it seemed carved in the wood and painted, the slate fastened on the timbers in pretty figures, that has, like a coat of armour, preserved it from rotting."

There seems to be some difference of opinion as to the means employed to protect the woodwork, for Pepys says, "Most of the house is covered—I mean the posts and quarters in the walls—with lead and gilded."

The covering of the timber posts with scales of slate is the usual method of protecting it, not only in the South of England, but in Brittany; but some of the more prominent portions of the palace, as, for instance, the principal entrance way, may have had the woodwork covered with lead and gilded. Either way it seems almost certain that these bas-reliefs were in plaster of some kind; had any of them—and there would seem to have been over three hundred—been in lead, it is impossible they should all have disappeared.

In the latter portion of his Paper Mr. Gardner referred to the introduction of some plaster from Italy, and more enduring and capable of more artistic treatment than lead. Does Mr. Gardner here refer to the introduction of the *stucco duro* into England, a description of which was given by Mr. G. T. Robinson in a communication he read to the Institute in 1891?

The composition of this *stucco duro*, which resembled the material referred to by Vitruvius, was discovered by Giovanni da Udine, and employed by Raphael in the loggie of the Vatican. It was brought to France by Primaticcio in 1531, and used by him in the figures decorating the great staircase at Fontainebleau, and Henry VIII. is said to have invited many Italian and other artists to England, and among them Toto dell Nunziata. Mr. Robinson quotes Vasari, who says, in speaking of this artist, "he did all manner of work for the King in architecture, and in particular the principal palace." But the only palace erected by that monarch was that of Nonsuch, and, as stated by Mr. Robinson, "each panel was filled with a coloured stucco figure, exactly the kind of work suited to Toto's training."

We can only regret that these bas-reliefs were not in lead, because some of them would have found their way into various collections; and I am quite willing to agree with Mr. Gardner as to the possibilities of lead in that direction, which is what he desires to encourage.

Lead Architecture: Richmond Palace.

From RALPH NEVILL, F.S.A. [F.]—

Mr. Gardner, in his interesting Paper, leaves it rather doubtful if he realises that Shene was

simply the earlier name for Richmond Palace. On the completion of the rebuilding in 1501, after a fire, Henry VII. changed the name to Richmond.

In vol. iv. of Brayley's *History of Surrey* are numerous extracts on the subject of Nonsuch.

The following from Evelyn's *Diary* is, I think, conclusive as to the outside figures being of stucco; so experienced a builder as Evelyn could hardly have been mistaken, although it is fair to say that he states that the timbers were covered with slates cut to ornamental patterns, and used as weather tiles. Pepys, however, describes the coverings as of metal. It is possible that slates, cut in the Devon fashion, may have been used on some of the outer timbers, and lead in the inner courts.

1665-6, Jan. 3: "Tooke an exact view of y^e plaster statues and bass-relievos inserted 'twixt the timbers and punchions of the outside wallies of the Courte; which must needs have been the work of some celebrated Italian. I much admir'd how they had lasted so well and intire since the time of H. VIII. expos'd as they are to the aire; and pitty it is they are not taken out and preserv'd in some drie place; a gallerie would become them. There are some mezzo-relievos as big as the life; the stories of y^e Heathen Gods, emblems, compartments, &c."

The Surveys of 1650 for Richmond, Wimbledon Park, and Nonsuch, are printed in vol. v. of the Surrey Archaeological Society's *Transactions*, and are most instructive.

Guildford.

Lead Architecture: Fanlights.

From BENJAMIN WALKER [A.]—

The illustration of the fanlight designed by the brothers Adam for Drapers' Hall, given in Mr. Starkie Gardner's Paper on Lead Architecture (p. 145 *ante*), suggests a question which it would be interesting, I think, to have answered. Were these decorative features cast in pure lead? I call one or two examples to mind, and am strongly of opinion that they were not, but that the lead was hardened by the addition of a certain amount of tin. Perhaps some reader of the JOURNAL may have had the opportunity of carefully examining some of these fanlights, and can say whether this is so or not.

Building Laws of Babylon, 2258 B.C.

From R. LANGTON COLE [F.]—

I understand that the Council R.I.B.A. are considering, in consultation with the London County Council, the amendment of the London Building Act. I venture, therefore, to draw their attention to the oldest building laws which have, so far as I am aware, been hitherto discovered, in the hope that their simplicity and directness may

suggest the removal of some of the complications which disfigure modern legislation on the same subject.

The stele of Khammurabi, or Hammurabi, King of Babylon about 2250 B.C. (4,000 years ago), was discovered by M. De Morgan, in 1902, on the acropolis of Susa, and its inscriptions of some 3,600 lines abound in interesting matter, most of which has been referred to in the daily press.

The extract given below is taken from Mr. St. Chad Boseawen's *First of Empires*, and the translation has been kindly checked for me by an Assyriologist friend. The latter informs me that the word for builder (*bannu*) is translated "architect" by another authority, but that *rab-bannu* (master builder) would have been used if an architect had been meant, and the context is so wholly inappropriate to the latter that such a translation may be dismissed as unworthy of notice.

It is interesting to note that in some similar laws relating to shipbuilding there is the exact counterpart of the modern twelve months' maintenance clause, so that it would seem that this ancient ruler was a wise and prudent person, and would have made an admirable Hon. Member of the Institute.

BUILDING LAWS OF KHAMMURABI, 2258 B.C.

CCXXVIII. If a builder builds a house for a man, and completes it, he shall pay two shekels of silver for each sar of surface.

CCXXIX. If a builder build a house for a man, and has not made his work strong, and the house has fallen in and killed the owner of the house, then that builder shall be put to death.

CCXXX. If it kill the son of the owner of the house, the son of that builder they shall kill.

CCXXXI. If it kill the slave of the owner of the house, a slave equivalent to that slave, to the owner of the house he shall give.

CCXXXII. If the property [or "furniture"] of the owner of the house it destroys, whatever it destroys he shall make good, and as regards the house he built and it fell, with his own property he shall rebuild the ruined house.

CCXXXIII. If he build a house for a man, and did not set his work, and the walls topple over, that builder from his own money shall make that wall strong.

LEGAL REGISTRATION OF ARCHITECTS.

Glasgow.

To the Editor of the JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

DEAR SIR,—Registration appears to me to have been erroneously handled, so perhaps I may be excused for trying to unravel a little.

Bill A. is the short title which I give to the Bill lately promoted by Mr. Atherley Jones and others. This has failed to obtain the general support desired, and has produced a strong opposition to it, probably because it gives away, legally, permanently, and absurdly, many of the advantages which its advocates think that it ought to obtain. This is very important, and everyone in favour of registration should get a copy of that Bill (Eyre & Spottiswoode, 3d.) and read for himself how it commits suicide. It is much worse than useless.

A Registration Bill might be expected to divide the profession into three classes, as follows:—*Allies*: The architects now in practice who are members of the Royal Institute of British Architects or Allied Institutes and Societies. *Residues*: The architects in practice who are not Allies. *Futures*: Those who will in future be architects.

Allies are of course the ones that registration would be for. They would be entitled to registration in virtue of their being at present members of the Royal Institute of British Architects, or of its Allied Institutes and Societies.

Residues have already existing rights that *ex necessitate rei* must be respected. An honourable Registration Bill should have a prominent part of it distinctly stating that the existing rights of architects now in practice are not to be affected, and it should create an official list of the names and addresses of all of them, so as clearly to free them for life from the penalties of the Bill, and at the same time prevent additions to their number. But Bill A. goes a long way beyond that. In a ridiculously over-generous way it blunders on to the unnecessary full extreme, and practically forces the *Residues* to be registered and possess every advantage. This is what creates disgust at Bill A.

Residues would unavoidably obtain a certain amount of recognition by having their names and addresses in a recognised official list of ordinary architects.

It would also be wise for the Bill to give them for life the privilege of at any time proposing to be registered (without requiring to pass examinations) by means of an application form, stating the date at which they commenced to practise for themselves, and such further particulars as they may deem explanatory or the electing body may require, and each applicant should send in photos or

drawings of at least three buildings to which he has been architect.

The argument is used that it would be impossible to get sanction to a Bill that did not provide for the registration of every existing architect. In answer to the question why, we are told that it would be impossible to obtain powers that would take away the existing rights of any architects. Of course. But there is an immense distance between preserving to them all their existing rights and the alternative of registering them as possessing all the knowledge and capacity of an architect, which we know some of them do not possess.

Bill A. has abundantly proved that its authors have not succeeded in producing a satisfactory solution of the question.

Futures, of course, would have to pass the examinations that were arranged.

Yours truly,

HORATIO K. BROMHEAD.

ALLIED SOCIETIES.

LEEDS AND YORKSHIRE SOCIETY.

The fifth General Meeting of the Session was held in the Society's Rooms on 28th January 1904, the President, Mr. Butler Wilson [F.], in the chair. Mr. J. Alfred Gotch, F.S.A. [F.], read an interesting Paper entitled "The Homes of Queen Elizabeth." The lecturer referred to the fact that, for some years prior to Elizabeth's reign, domestic habits had been changing, and it had been growing less necessary to make dwellings secure against attack. Wealth had increased, and a widespread desire for greater comfort led to many new houses being built and old ones being remodelled.

Coincident with this activity in building there was a new influence at work which had an effect upon architectural ornament. The Renaissance of classic art originating in Italy spread its ramifications over the intervening countries, and finally reached England. This tended to bring the style of English houses more or less into line with that which had established itself in Italy and the intermediate countries. Although English tradition was predisposed to Gothic forms, the new fashion, which was classic, resulted in that piquant mingling of the two styles which distinguishes most Elizabethan houses. Although a great change came over their appearance, the plans of the houses still followed traditional lines, subject to an ever-growing endeavour to secure symmetrical disposition. In not a few instances the curious pedantry which affected some of the literature of the period also dominated the buildings. Many

examples were shown upon the screen, including plans of Elizabethan houses and their surroundings. Views illustrative of the external and internal treatment of many of the best known examples were presented, including Wollaton Hall, Holdenby House, Kirby Hall, Longleat, Drayton, Fountains Hall, Haddon Hall, and some of the colleges at Oxford and Cambridge.

Mr. Robert P. Oglesby, in moving a vote of thanks to Mr. Gotch, remarked that the lecturer was evidently of opinion that an architectural Paper need not necessarily be a dry one, and expressed the wish that lecturers would follow Mr. Gotch's example in relieving his discourse by many welcome touches of humour. It seemed to him that the lecturer had come in a somewhat iconoclastic frame of mind, determined to completely demolish the Dorothy Vernon legend, which is one of the cherished possessions of Haddon Hall. A feature of the Paper which gave him particular pleasure was the manner in which Mr. Gotch had caused his study of the architecture of the period to go hand in hand with the study of the personages who built and inhabited these houses, together with their history, customs, and manners. To his mind these studies were inseparable, and proved of the greatest value to the student of any particular period.

Mr. G. B. Bulmer [F.] seconded the vote, and referred to some particular examples which Mr. Gotch had illustrated as bearing upon a work of restoration in Oxfordshire which he had just completed.

Mr. Butler Wilson [F.], President, in conveying the vote of thanks, spoke in warm terms of Mr. Gotch's distinguished contributions to the descriptive and illustrative chronicles of the Early Renaissance in England.

MINUTES. VII.

At the Seventh General Meeting (Ordinary) of the Session 1903-4, held Monday, 1st February 1904, at 8 p.m., the President, Mr. Aston Webb, R.A., F.S.A., in the Chair, with 28 Fellows (including 14 members of the Council), 30 Associates (including 4 members of the Council), and numerous visitors, the Minutes of the Meeting held 18th January 1904 [p. 164] were taken as read and signed as correct.

The following candidates for membership, found by the Council to be eligible and qualified for membership according to the Charter and By-laws, were recommended for election, viz.:—As FELLOWS, Arthur Edward Bartlett (Assoc. 1891); Thomas Cooper (Assoc. 1892) (Birmingham); Banister Flight Fletcher (Assoc. 1889, *Geoffrey Burnor* 1893, *Inst. Essay Medallist* 1896); Sidney Frank Harris (Assoc. 1893) (Northampton); Arthur Kien; Charles Richard Guy Hall (Assoc. 1888); Frank Manoh Kent (Pietermaritzburg, Natal); Henry Winter Johnson (Market

Harborough); Alfred Hill Parker (Worcester). As ASSOCIATES,* Herbert Wilson Asman (*Probationer* 1898, *Student* 1901) (Bradford); Lawrence Lee Bright (*Inst. Medallist Drawings* 1901) (*Probationer* 1895, *Student* 1899) (Nottingham); Manuel Nunes Castello (*Probationer* 1899, *Student* 1900); Horace William Cubitt (*Probationer* 1897, *Student* 1899); William Robert Davidge (*Probationer* 1898, *Student* 1900); William John Delbridge (*Probationer* 1899, *Student* 1901); George Dykes, jun. (*Probationer* 1894, *Student* 1902) (Glasgow); Henry Tatty Fowler (*Probationer* 1892, *Student* 1894) (Barrow-in-Furness); Harold Griffiths (*Qualified* 1888); Edwin George Harry Gunn (*Probationer* 1899, *Student* 1901); Willie Hemingway (*Probationer* 1898, *Student* 1900) (Bolton); Holland William Hobbiss (*Probationer* 1897, *Student* 1899); Frank Garfield Johnson (*Probationer* 1899, *Student* 1902) (Newport, Mon.); John Stevens Lee, *Title Prizeman* 1898 (*Probationer* 1893, *Student* 1895); Henry Blinman Mackenzie (*Probationer* 1897, *Student* 1899) (Cardiff); Francis Winton Newman (*Ashpitel Prizeman* 1903) (*Probationer* 1895, *Student* 1897); Henry Melanethon Pritchard (*Probationer* 1900, *Student* 1901) (Cardiff); Thomas Henson Robinson (*Probationer* 1895, *Student* 1896); Andrew Rollo (*Inst. Medallist Drawings* 1903) (*Probationer* 1897, *Student* 1900); George Leonard Russell (*Probationer* 1897, *Student* 1899); Henry Walcott Stone (*Probationer* 1900, *Student* 1901) (Birmingham); Joseph John Wood (*Probationer* 1897, *Student* 1899) (Leeds). As HON. CORRESPONDING MEMBER, Glenn Brown, Fellow of the American Institute of Architects (Washington, D.C., U.S.A.).

A communication was read from Mr. A. Saxon Snell [F.] announcing that his father, the late Mr. Henry Saxon Snell, had bequeathed the sum of £750 to the Institute to found and maintain a special triennial scholarship.

The President announced that the Council proposed to submit to his Majesty the King the name of M. Auguste Choisy [Hon. Corr. M.], Chief Engineer in the Service des Ponts et Chaussées, Paris, as a fit recipient of the Royal Gold Medal for the current year.

The President having delivered the Annual Address to Students, the Secretary—in the absence of Mr. James S. Gibson [F.], the author—read a Criticism of the Works submitted for the Prizes and Studentships: whereupon, on the motion of Mr. Goscombe John, A.R.A., seconded by Mr. W. D. Carö, M.A., F.S.A. [F.], a vote of thanks was passed by acclamation to the authors of the Addresses, and was responded to by the President.

* Except where otherwise stated, all the candidates for Associateship passed the Qualifying Examination last November.

The President directed attention to the drawings the result of the tours of the following travelling Students: Mr. Jas. B. Fulton, *Soane Medallist* 1902, Mr. Chas. Gascoyne, *Title Prizeman* 1902, and Mr. J. Harold Gibbons [A.], *Pugin Student* 1903.

The presentation of prizes in accordance with the Deed of Award was then made by the President, and the various Students introduced, as follows:—

ERRAT PRIZE.

Medal of Merit and £10 10s. to Mr. Claude Batley.

MEASURED DRAWINGS MEDAL.

Silver Medal and £10 10s. to Mr. Laurence M. Gotch.

Certificate of Hon. Mention to Mr. G. S. Salomons.

Certificate of Hon. Mention to Mr. C. Lovett Gill.

SOANE MEDALLION.

The Medallion to Mr. Frederic J. Horth.

Certificate of Hon. Mention to Mr. David Smith.

OWEN JONES STUDENTSHIP.

Mr. W. Davidson introduced as the *Owen Jones Student*.

Medal of Merit to Mr. H. Morley.

PUGIN STUDENTSHIP.

Mr. F. C. Mears introduced as the *Pugin Student*.

Medal of Merit to Mr. W. S. A. Gordon.

GODWIN BURSARY.

Mr. H. Phillips Fletcher [F.] introduced as the *Godwin Bursar*.

TITE PRIZE.

Certificate to Mr. Heaton Comyn [A.].

Medal of Merit to Mr. Arthur D. Nicholson.

ARTHUR CATES PRIZE.

£21 to Mr. F. Winton Newman.

Certificate of Hon. Mention to Mr. Baxter Greig [A.].

GRISSELL GOLD MEDAL.

Gold Medal and £10 10s. to Mr. J. William Hepburn.

Medal of Merit to Mr. Arthur Jas. Barclay.

ASHPITEL PRIZE.

Books of the value of £10 to Mr. F. Winton Newman.

PUGIN STUDENTSHIP 1903.

Medal and £40 to Mr. J. Harold Gibbons [A.].

TITE PRIZE 1902.

Cheque for £10 to Mr. Charles Gascoyne.

The proceedings then closed, and the meeting separate at 9.30 p.m.

THE LONDON BUILDING ACTS AMENDMENT BILL 1904.

RECOMMENDATIONS OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The Council having been requested by the London County Council to submit suggestions as to the amending of the London Building Act 1894, in view of the Amendment Bill they propose to introduce into Parliament this year, at first referred the matter to the Practice Standing Committee. It appeared afterwards, however, that the suggestions of the Art and Science Standing Committees, on matters fully within their special spheres of interest, would be of great value, and references were accordingly made to these two committees. The three committees sent in to the Council their respective reports, and the task of collating and co-ordinating these was referred to a special committee consisting of the Chairmen of the Art, Practice, and Science Committees and two members of Council. The following recommendations and amendments, the result of their labours, have now been submitted to the London County Council:—

GENERAL PRINCIPLES.

1. The Act should be re-edited in order that better classification of the various Sections may be obtained, and so as to render it more intelligible to those using it, who, it must be remembered, are often inexperienced in legal phraseology.
2. In the administration of the Act more discretionary power should be given to the London County Council, the Superintending Architect, and the District Surveyors to meet special cases arising.
3. The District Surveyors should be practising Architects. It is recommended that no one should be appointed who has not been in practice as an Architect for at least 7 years, or as an Assistant to a practising Architect for at least 10 years.
4. In all cases where discretionary power is given to the L.C.C., the Superintending Architect, and District Surveyors there should be power to appeal to the Tribunal of Appeal, and parties should be able to appear either personally or by counsel. Powers should be taken to enlarge the Tribunal, if necessary, so as to enable decisions to be given with as little delay as possible. Differences arising under Parts IX. and X., and also appeals from awards under Part VIII. and any other technical points arising, should also be referred to the Tribunal.
5. Greater publicity should be given to proposed new By-Laws, and objections to them should be heard before the Tribunal of Appeal who should report to the Secretary of State before the By-Laws are confirmed.
6. The recommendations of the Royal Institute of British Architects relating to Fire Protection and Means of Escape, already before the L.C.C. in connection with the Bill withdrawn in the earlier part of last year,* should be considered in conjunction with the following recommendations except as herein amended.
7. The schedule of fire-resisting materials wants reconsideration when the main body of the Act has assumed more definite shape.

* These recommendations have already been printed in the *JOURNAL* with the explanations of the Chairman of the Practice Committee. See *JOURNAL*, 7th March 1903, p. 237 *et seq.*

8. Suggested sections relating to Pier Construction are submitted as Appendix A to these recommendations.

9. Suggested sections relating to Skeleton Frame Buildings are submitted as Appendix B.

It is suggested that these sections should be treated as By-laws rather than be inserted in the Act, or if embodied in the Act power should be taken to vary them as experience proves to be necessary: see fifth item, section 164 (1) of existing Act.

10. Suggestions relating to Supports under Superstructures are submitted as Appendix C.

RECOMMENDATIONS UPON THE PRESENT ACT, IN DETAIL.

PARTS I.—XI.

- SECTION 5 (1) & (2): The definitions of "street" and "way" are too comprehensive. A court, alley or passage not dedicated to the public, and not a thoroughfare, should be exempt.
- " (20): *Add at end of section:* "and shall also apply to the structure or wall or portion of same upon which a party wall rests in the cases where such party wall does not extend to the ground or foundation level as a party wall."
- " (25): Substitute for the present wording after the words "to be used" as follows:—"to a greater extent than half the cubical contents for human habitation."
- " *Additional definition:* The term "working classes" should be defined.
- SECTION 7: *Add at end of section:* "Provided that if the said street be in conformity with this Act no conditions limiting the time in which such street shall be made laid out or formed shall be attached to such sanction."
- SECTION 8, line 4: *After word "street" insert* "and throws the same open for public use."
- " line 7: *Delete from* "abutting on" *to* "formed," *and substitute* "or fronting on such street made or intended to be made laid out or formed thereafter."
- SECTION 9 (4), last line: *After "street" add* "already."
- Add at end of section:* "or to be formed and laid out for carriage traffic at the same time as the said street. Direct communication shall be deemed to be afforded between two streets by a street joining them either at their ends or at any point of their length forming a junction at any angle."
- SECTION 13 (1): It is considered that private property should not be taken under this Section unless compensation be given.
- " (5): The proviso as to workmen's dwellings should be omitted, as it prevents the best sites for this class being used.
- SECTION 19: *Substitute for this Section the following:* "Whenever any difference arises under Part II. of this Act the interested parties may appeal to the Tribunal of Appeal."
- SECTION 21: *Omit as being obsolete.*
- SECTION 22 (1): *Add at end of Section:* "In defining the said general line in the case of a new building at the corner of two streets he shall have regard to the general line of frontage of the principal street only."

- SECTION 39: *Omit all words after "to be used," and substitute "to a greater extent than half the cubical contents as offices counting houses or business premises other than buildings of the warehouse class."*
- SECTION 41 (1) (i): *Instead of words "open space" read "space open to the sky."*
- " (ii): *Substitute for this Clause the following: "No building shall in any part thereof be nearer to the rear boundary of the curtilage thereof than ten feet provided that in the case of any building upon a corner site the said area may be arranged in a convenient position to the satisfaction of the Superintending Architect and not necessarily extend the entire width of the rear of such building."*
- SECTION 47: *Insert before the last paragraph of this Section the following: "Where any building is erected or intended to be erected on a corner plot so as to abut upon more than one street the height of the building shall (unless the Council otherwise consent) be regulated by the wider of such streets so far as it abuts or will abut upon such wider street and also so far as it abuts or will abut upon the narrower of such streets to a distance of 40 feet from the building frontage in such wider street. The height of the remaining portion of the frontage to the narrower street shall be limited by the section regulating the height of buildings in such street except that it shall be lawful in such case where the buildings previously existing on such remaining portion were of a greater height to rebuild them to the same height or heights."*
- SECTION 49: *In order to conform with Section 47 (as amended) delete the second paragraph commencing "where" and ending "existing height."*
- SECTION 51: *Delete.*
- SECTION 53: *Add at end of Section: "Except as hereinafter provided under the Section relating to steel construction."*
- SECTION 54: *Omit the words in last paragraph: "With respect to the area of recesses and openings."*
- SECTION 56 (1), line 1: *Omit words "whether of wood or metal."*
Add at end of Section: "Provided that any bressummer of metal may be supported solely on a sufficient metal stanchion embedded in the party or external wall so that such stanchion shall not be nearer to the centre of a party wall than four inches and in any such case no pier in addition to the party wall shall be required."
- " (2): *Delete.*
- " (4): *Delete and substitute following: "Every bressummer bearing upon a party wall shall be borne by a templet of stone or iron or vitrified stone-ware or a corbel of stone or iron tailed through at least half the thickness of the wall and of the full breadth of the bressummer."*
- SECTION 58, at end: *Insert after the word "length" the words "and height."*
- SECTION 59 (1), line 1: *After "party wall" insert "except as hereinafter provided."*
- " " line 4: *Delete the words "of the highest building adjoining thereto."*
Add at end of sub-section: "In a building other than of the warehouse class the roof whereof is wholly constructed of fire-resisting materials the party-wall shall be carried up of a thickness of at least eight and a half inches to the underside of such roof surface."

SECTION 59 (2), lines 4 & 7: For "four" read "three."

SECTION 61 (1), line 1: For "and every turret, &c.," read "and of every turret, &c."

" (3), line 3: After the word "horizon" add the words "unless such roof be constructed of fire-resisting materials."

" " Add at end of section the words "or structures giving access to roofs."

" (4): Amendments similar to those in sub-section 3.

" " line 3: For "seventy-five degrees" read "eighty-five degrees."

SECTION 63: Dealt with in fire protection recommendations.

SECTION 64 (1), line 2: After "erected" insert "above lowest floor."

" (9): Add at end of sub-section: "Provided always that where a ventilating flue is carried up with a smoke flue they may be separated by a properly constructed iron wythe."

" (10): For "party wall" read "party and internal walls." For "mantel" read "lintel or arch." Add at end of sub-section: "except where fireplaces in such internal walls are back to back."

" (13): Add at end of sub-section: "No chimney flue shall be nearer than two inches to the centre line of any party wall. No iron or steel joist shall be built into any flue."

" (15), line 4: For "eighteen" read "twelve."

" (18), line 2: Omit word "new."

SECTION 66 (4): Insert after the words "heated air" the words "other than air heated by hot water at low pressure."

SECTION 67: Insert after the word "floor" the words "or roof."

SECT. 70 (1) (a): For "eight feet six inches" read "eight feet."

" " (d), line 1: Omit the word "basement" and add after the word "room" the words "next the ground."

" " (e): In second paragraph for "nine" read "four and a half."

SECTION 73 (1), line 11: For "fireproof" read "fire-resisting."

" (2): Add to end of sub-section: "except in streets sixty feet wide and over where cornices may be projected not more than three feet six inches over the public way."

" (5) (a): Omit entirely.

" " Alter the end paragraph of sub-section commencing "Bay windows" as follows: Add after the word "erected" the words "beyond the general line of frontage."

" (6): In first paragraph after the word "windows" insert "balconies."

" " (a): For whole proviso read: "The face of such projections shall not extend more than three feet from the face of the front wall of the building or more than twelve inches over the public way exclusive of the cornices mouldings or other architectural features of such projections."

" " (d): After the word "together" add "except in the case of balconies."

" " (e): Delete all words after "District Surveyor."

SECTION 73 (b) : *Last paragraph of sub-section commencing "oriel windows" to be altered as follows: "Oriel windows turrets or balconies to which the foregoing rules do not apply" &c.*

" *Add definition: "An oriel window is any projecting window corbelled out from an external wall or the masonry of which does not extend downwards to the level of the ground."*

SECTION 74: *Substitute for the whole section the following:*

- " (1) Every building shall be separated either by an external wall or by a party wall or other party structure from the adjoining building (if any) and from each of the adjoining buildings (if more than one) and every such party structure shall be constructed of incombustible materials to the satisfaction of the District Surveyor.
- " (2) Separate sets of chambers or offices or rooms tenanted or constructed or adapted to be tenanted by different persons shall if contained in a building exceeding forty feet in height and ten squares in area taken at the level of the first floor be separated so far as they adjoin horizontally by floors or arches constructed of fire-resisting materials and if such sets of chambers offices or rooms are contained in a building exceeding twenty-five squares in area taken at the level of the first floor all the floors throughout and the principal staircases and enclosures of same shall be constructed of fire-resisting materials;
- " (3) A District Surveyor shall not be entitled to charge for the inspection of each such set of chambers or offices or rooms as a separate building;
- " (4) No building containing separate sets of chambers or offices or rooms tenanted or constructed or adapted to be tenanted by different persons shall without the consent in writing of the Council extend to more than fifty squares in area unless the floors be constructed throughout of incombustible materials not less than six inches thick and the principal stairs and the supporting enclosures thereof be of incombustible materials.
- " (5) In every building exceeding ten squares in area used in part for purposes of trade or manufacture and in part as a dwelling house the part used for the purposes of trade or manufacture shall be separated from the part used as a dwelling-house vertically by walls or partitions and horizontally by floors such partitions and floors to be constructed of fire-resisting materials other than wood and all passages staircases and other means of approach from the front door provided that such front door be set back not more than five feet from the front of the building to the part used as a dwelling-house shall be enclosed with and constructed throughout of fire-resisting materials other than wood to the satisfaction of the District Surveyor. The part used for purposes of trade or manufacture shall (if extending to more than two hundred and fifty thousand cubic feet) be subject to the provisions of the Act of 1894 relating to the cubical extent of buildings of the warehouse class;
- " (6) All passages and staircases and other means of approach referred to in the last preceding sub-Section of this Section shall be not less than three feet wide.
- " (7) A staircase enclosed and constructed as aforesaid shall be provided in every such building as is referred to in the two last preceding sub-Sections of this Section which has any story above the ground story and where any space intervenes between the termination on the ground floor of such staircase and the street there shall be provided from the termination of such staircase to the street a passage enclosed and constructed as

- aforesaid unless means of escape to the satisfaction of the Council are provided from the side rear or roof of the building;
- "(8) If the area of such building exceeds fifty squares an additional staircase and (if the circumstances so require) a passage enclosed and constructed as aforesaid shall (unless the Council otherwise permit) be provided in respect of every fifty squares or part of fifty squares beyond the first fifty squares.
- "(9) It shall be lawful to construct in the walls of such staircases and passages such doorways as are necessary for communicating between the different parts of the building and all internal doorways leading from the portion of the building used for trade or manufacture to such staircases and passages shall be fitted with self-closing doors of fire-resisting material hung in frames of fire-resisting material;
- "(10) Nothing in this Section contained shall (except for the purpose of a party structure separating buildings) prevent the use of solid wooden joists placed close together or wooden joists in conjunction with pugging of a fire-resisting material of a thickness of not less than five inches for the construction of fire-resisting floors;
- "(11) Any building structure or work which has been commenced before and is in progress at the date of the commencement of this Act or which is to be carried out under any contract entered into before the passing of this Act shall not be subject to the preceding provisions of this Section but may and shall be completed subject to and in accordance with the provisions of the Acts relating thereto as in force immediately previous to the passing of this Act."

SECTION 76 (i):

Delete.

SECTION 77:

Delete and substitute: "Buildings shall not be united except under the following conditions:—

- "(1) If when so united and considered as one building only they would not be in conformity with this Act.
- "(2) An opening shall not be made in any party wall or in two external walls dividing buildings which if taken together would extend to more than 250,000 cubic feet except under the following conditions:—
- "(a) Such opening shall not exceed in width seven feet, or in height eight feet, except with the consent of the Council, and such opening or openings taken together shall not exceed one-half the length of such party wall on each floor of the building in which they occur.
- "(b) Such opening shall have the floor jambs and head formed of brick stone or iron and be closed by two wrought iron doors each a quarter of an inch thick in the panel at a distance from each other of the full thickness of the wall fitted to rebated frames without woodwork of any kind or by wrought iron sliding doors or shutters properly constructed and provided with bolts or other fastenings fitted into grooved or rebated iron frames or such other fire-resisting doors as may be approved from time to time by the Council.
- "(c) If the thickness of the wall be not less than twenty-four inches or the doors be placed at a distance from each other of not less than twenty-four inches such opening may be nine feet six inches in height or such other greater height as may be approved by the Council.
- "(d) For purposes of this section buildings which adjoin may be united in whole or in part if those portions in separate occupations are separated by a floor or floors or other horizontal divisions of fire-resisting materials not less than eight inches thick."

- SECTION 78, line 6: For "tribunal of appeal and save so far, &c." read "tribunal of appeal. For the purposes of this section the District Surveyor or in the event of disagreement the tribunal of appeal may in his or their discretion vary or depart from any of the enactments in this Act as to the construction of buildings that may appear to him or them necessary or desirable to suit the special circumstances of the case of any public building or any one or more of a series of public buildings or their accessories or connections within one curtilage and save so far, &c. &c."
- SECTION 80: The width of passage to apply to doorway, the clear opening between the doors when open to be the full width of the passage less double the thickness of the door.
- SECTION 84: The Royal Institute recommends that it should be defined what portion, if any, is now administered by the Council.
- SECT. 88 (6), lines 1 and 3: After "party structure" add "or external wall."
- SECTION 90 (1), line 7: Add after the word "any" the words "external or." Add at end of sub-section: "Such notice shall not be deemed to be invalid if on further investigation variations in the work proposed to be done are found to be necessary by the Surveyors to be appointed as hereinafter provided."
- " (4): For "six months" read "twelve months."
- SECTION 91 (10): For "a Secretary of State" read "the President for the time being of the Royal Institute of British Architects."
- SECTION 92: Add at end of section: "The duly appointed Surveyors shall have power at all reasonable times to enter the premises of the building owners and adjoining owners for the purpose of examining the same or inspecting the works authorised by this part of the Act."
- SECTION 93 (1), line 1: For "two months" read "one month."
- " " line 4: For "shall" read "may."
- " (3), line 2: Omit word "inconvenience."
- " Add new sub-section: "(5) Such notice need not be served in respect of any wall as to which a Party Structure Notice is necessary to be served under this Act."
- SECT. 95 (2) (d), line 1: For "floor" read "flue."
- " (f): In third line of second paragraph of sub-section strike out "as aforesaid." As it stands only buildings erected after 1894 are affected.
- SECTION 96, line 1: For "one month" read "six months."

PART XII.

It is believed that this part of the Act requires revision to bring it up to date.

PART XIV.

- SECTION 164 (4): The List should include *The Times*, and at least four other London daily or weekly papers.

PART XV.

- SECTION 175: See under "General Principles."
- SECTION 190: In accordance with previous suggestions this Clause to be subject to the tribunal of appeal.
- SECTION 198: This Clause should be more explicit.

SECTION 216 :

It is recommended that matter included in By-laws made since the Act was passed should be as far as possible incorporated in the body of the new Act.

FIRST SCHEDULE.

PRELIMINARY.

SECTION 5 :

Omit whole and substitute: "Hollow walls may be constructed provided the aggregate thickness of the material shall equal the thickness provided under this Schedule and that the two sections of the wall shall be properly bonded together with approved ties not less than one tie to every three superficial feet, and that the inner section of the wall be in no case less than eight and a half inches in thickness unless the two sections of the wall be built in cement mortar. Walls may also be built in two thicknesses provided that they be built in cement and the space between them be not less than three-quarters of an inch wide and be filled with an approved bituminous composition."

SECTION 7, line 3 :

After "full height or not" omit the rest of section.

SECTION 8 :

Add at end of section the words: "Where a wall without return walls is divided into portions of different heights the thickness of each of such portions shall be governed by the height of such portion and by the length of the entire wall."

PROPOSED NEW SECTIONS.

"SECTION 12: If any external or party wall measured from centre to centre is not more than twenty-five feet distant from any other external or party wall to which it is tied by the beams of any floor or floors other than the ground floor or the floor of any story formed in the roof the length of such wall is not to be taken into consideration in deciding the thickness."

"SECTION 13: Where buttresses or piers are built with external walls of thicknesses in excess of those required by the Act the walls between such piers or buttresses may be of less thickness than required for walls without such piers or buttresses at the discretion of the District Surveyor but provided that no such wall shall be of less thickness than fourteen inches." (N.B. *vide* Appendix A.)

PART I.

SECTION 1 :

In second paragraph omit words "and does not comprise more than two stories."

PART II.

SECTION 1 :

Delete.

SECTION 2 :

Omit words "exceeds twenty-five feet but."

MISCELLANEOUS.

SECTION 1, line 7 :

For "one half" read "two-thirds."

STEEL CONSTRUCTION.

Provisions to be made for this by By-laws which should be modelled on the most recent American Building Acts such as those of New York and Philadelphia; but suggestions (Appendix B) are offered. Should the London County Council think fit to sanction the suggestion as to skeleton frame buildings, the District Surveyor's fee for such special calculation should be upon a sufficient scale to ensure the work being properly done.

SECOND SCHEDULE.

PART II.

SECTION (2): *Before word "granite" insert "cement concrete."*

NOTE.—A number of new fire-resisting materials are now available and more are likely to be introduced; the materials specified in the Schedule should therefore be enlarged and greater facilities given for their use.

SECTION (7): *Delete and substitute: "Floors (below the floor boards) formed of wood joists filled in with concrete not less than five inches thick composed of broken brick stone chippings ballast pumice or coke-breeze mixed with lime cement or calcined gypsum provided a fillet is secured to the side of the joists in the middle of the concrete or otherwise to the satisfaction of the District Surveyor."*

APPENDIX A.

SUGGESTED SECTIONS RELATING TO PIER CONSTRUCTION OF BUILDINGS.

Notwithstanding anything contained in the principal Act requiring buildings to be enclosed with walls of the thickness therein defined, it shall be lawful to erect buildings of pier construction subject to the following provisions:

1. The load of all floors and roofs shall be concentrated at points vertically over each other on the bearing walls, at which points piers carried up to the roof and continuous throughout their height shall be erected; and there shall be extending from pier to pier and properly bonded therewith a curtain wall enclosing the building.

2. No curtain wall shall be of less thickness than $8\frac{1}{2}$ inches for the topmost 20 feet of its height, nor less than 18 inches in thickness for the remainder of its height below such topmost 20 feet, provided that window backs may in all cases be $8\frac{1}{2}$ inches in thickness.

3. The collective width of the piers on any wall shall amount to at least one-fourth of the total length of the wall and piers taken together; and no pier shall be less than $17\frac{1}{2}$ inches in width.

4. The thickness of the pier shall be in addition to the thickness of the curtain wall and shall be as follows:

(a) The thickness at the top and for 20 feet below the top shall be $8\frac{1}{2}$ inches, and the intermediate parts of the pier between the base and 16 feet from the top shall be of not less thickness than would be the case if the pier were built solid throughout the space between straight lines drawn joining the thickness of the base to the thickness at 20 feet from the top.

(b) The thickness at the base shall be:

If the pier does not exceed 30 feet in height, not less than $8\frac{1}{2}$ inches						
"	"	"	40	"	"	13 "
"	"	"	50	"	"	$17\frac{1}{2}$ "
"	"	"	60	"	"	$21\frac{1}{2}$ "
"	"	"	70	"	"	26 "
"	"	"	80	"	"	31 "

With an additional $4\frac{1}{2}$ inches for every additional 10 feet or part of 10 feet in height beyond 80 feet.

5. Openings may be made in the curtain wall in accordance with section 54 of the principal Act.

6. Any of the piers may, with the sanction of the district surveyor, be discontinued for any portion of its height, provided that the remaining piers be proportionately increased on plan by additional brickwork or stonework, or be supplemented by iron or steel stanchions or columns to the satisfaction

of the district surveyor, and that any bressummer employed shall be to the satisfaction of the district surveyor.

7. Where the piers project on both sides of the wall the total thickness of both projections shall be not less than the thickness hereinbefore specified for the piers projecting on one side only.

8. Any non-bearing wall shall be of sufficient thickness if constructed with piers and curtain walls as hereinbefore provided for bearing walls, or if of 4 inches less in thickness than provided in the first schedule of the principal Act; provided that no wall shall be less than $8\frac{1}{2}$ inches in thickness at any part, and that not more than two stories shall be comprised within a wall of $8\frac{1}{2}$ inches in thickness.

APPENDIX B.

SUGGESTIONS FOR THE REGULATION OF SKELETON BUILDINGS.

Notwithstanding anything contained in the principal Act requiring buildings to be enclosed with walls of the thicknesses therein defined, it shall be lawful to erect buildings of iron or steel skeleton construction subject to the following provisions:

1. The skeleton framing in any wall shall be capable of safely sustaining, independently of any brickwork, the whole weight bearing upon such wall, including the weight of such wall and the due proportion of any floors and roofs bearing thereon, together with the live load on such floors and roofs.

2. The pillars supporting all iron or steel girders that carry walls or fire-resisting floors or roofs shall be of iron or steel, and shall be completely enclosed and protected from the action of fire by a casing of brickwork or concrete or other material approved by the district surveyor. Such casing shall, on the surfaces towards the exterior of the building, be at least $8\frac{1}{2}$ inches thick, and on all other surfaces at least 4 inches thick, the whole being properly bonded with the enclosing walls of the building. The term pillar shall include all columns and stanchions or an assemblage of such columns or stanchions properly riveted or bolted together.

3. The iron and steel girders (excepting in floors and staircases) shall be similarly cased with not less than 4 inches thick properly tied and bonded to the remaining work; but the flanges of the girders and the plates and angles connected therewith may approach within 2 inches of the surface of the casing.

4. Girders to support the enclosing walls shall be fixed at or within 4 feet of the floor line of each story.

5. No enclosing wall of the building shall be of less thickness than $8\frac{1}{2}$ inches for the topmost 20 feet of its height, nor less than 13 inches in thickness for the remainder of its height below such topmost 20 feet, provided that window backs may, in all cases, be $8\frac{1}{2}$ inches in thickness.

6. All brickwork and concrete shall be executed in cement and shall be bedded close up to the iron or steel without cavity between, and all joints shall be made full and solid. Nothing in this section shall prevent the use of stone as an external facing for buildings, provided that all work faced with stone shall be 4 inches thicker than hereinbefore provided.

7. (a) No steel or wrought iron pillar shall in any part be less than $\frac{1}{4}$ inch thick, nor shall any such pillar have an unsupported length of more than 40 times its least lateral dimensions, nor more than 160 times its least radius of gyration.

(b) The ends of all such pillars shall be faced to a true surface at right angles to the axis.

(c) All joints in such pillars shall be close butted with cover-plates properly riveted, and, except where unavoidable, no joint shall be made except at or near the level of a girder.

(d) The foot of all such pillars shall have a proper base-plate riveted thereto with sufficient gusset pieces to properly distribute the load on the foundations.

(e) Where any such pillars are built up hollow, the cavities shall either be filled up with cement concrete or be covered in at both ends to exclude the air.

8. (a) In any cast-iron pillar the metal shall not be in any part of less thickness than $\frac{3}{4}$ inch nor less than one-twelfth of the least lateral dimension. Nor shall such pillar have an unsupported length of more than 20 times its least lateral dimension nor more than 80 times its least radius of gyration.

(b) The caps and bases of such pillars shall be in one piece with the columns, or be connected thereto with a properly turned and bored joint sufficiently fixed.

(c) All such pillars shall be turned or planed top and bottom to a true face at right angles to the axis.

(d) All joints in such pillars shall be at or near the level of a floor, and shall be fixed and made with not less than four bolts at least $\frac{3}{4}$ inch in diameter.

(e) The foot of all such pillars shall have such area as may be necessary to properly distribute the load on the foundations.

9. All girders that carry walls or floors or roofs shall be of wrought iron or mild steel.

10. (a) All floors and all staircases (together with their enclosing walls) shall be constructed throughout of fire-resisting materials and be carried upon supports of fire-resisting materials.

(b) All iron and steel carrying loads used in the construction of any floor or staircase shall be protected from the action of fire by being encased to the satisfaction of the district surveyor in concrete, brickwork, terra-cotta or metal, lathing and plaster or cement without any wood firings.

11. All structural metal work shall be cleaned of all scale dust and rust and be thoroughly coated with one coat of boiled oil or paint or other approved material before erection, and after erection shall receive at least one additional coat.

12. (a) The dead loads of all buildings shall consist of the actual weight of walls, floors, roof, partitions, and all permanent construction.

(b) The live load shall consist of all loads other than dead loads.

(c) For the purpose of calculating the loads on pillars in buildings, the live load on floors shall be estimated as equivalent to the following dead load:

For dwelling houses, hotels, hospitals, lodging houses, and similar buildings, $\frac{1}{2}$ cwt. per superficial foot.

For office buildings, $\frac{3}{4}$ cwt. per superficial foot.

For places of public assembly, workshops, and retail shops, and similar buildings, 1 cwt. per superficial foot.

For buildings of the warehouse class, not less than 2 cwt. per superficial foot.

(d) The live load on the roof shall be estimated at $\frac{1}{2}$ cwt. per superficial foot measured on the surface of such roof.

13. For the purpose of determining the extreme load to be carried on pillars in buildings of more than two stories in height, a reduction of the live loads shall be allowed as follows:—

For the roof and top story the live load shall be calculated in full.

For the next succeeding lower story a reduction of 5 per cent. from the live load fixed by this section.

For the next succeeding lower story a reduction of 10 per cent.

For each succeeding lower story the amount of the reduction shall be 5 per cent. more than for the story immediately above until at the eleventh story from the top the reduction shall be 50 per cent.

For each remaining story, if any, below such eleventh story from the top the reduction shall be 50 per cent.

14. In pillars the actual working stress per square inch shall not exceed that given in the following table and in like proportion for intermediate ratios:

Where the Length divided by Least Radius of Gyration Equals.	Working Stress in Tons per Sq. Inch of Section.		
	Cast Iron.	Steel.	Wrought Iron.
160	—	2.512	2.142
140	—	2.957	2.477
120	—	3.400	2.825
100	—	4.017	3.170
80	1.875	4.452	3.470
60	2.442	4.832	3.727
40	3.026	5.100	3.895
20	3.464	5.290	4.000

Where a pillar is built into a wall the radius of gyration of that pillar in the direction of the thickness of the wall shall be taken for the purpose of the above table.

15. The actual working stress of iron and steel (except in the case of pillars as hereinbefore set out) in tons per square inch of sectional area, shall not exceed those given in the following table :

	Tension	Compression	Shearing	Bearing
Cast iron	11½	7	2½	8
Wrought iron	5	4	4	4
Mild steel	7½	6	5	10
Cast steel	5	10	7½	15

16. In addition to the foregoing provisions and the general rules of construction for buildings of the class to which they belong, as required by the principal Act and any amendment, all skeleton frame buildings shall, as regards their metal framing, bracing, walls, partitions, floors, roofs, staircases, and foundations, be constructed in such manner as may be approved by the district surveyor.

17. The person proposing to erect a skeleton frame building shall, one month before commencement of the building, deposit with the district surveyor a complete set of the drawings of such building showing the details of construction of all its parts, together with a detailed copy of all the calculations of the stresses and material, such calculations to be in such form as the Tribunal of Appeal shall from time to time determine. Should such drawings or calculations be in the opinion of the district surveyor not in sufficient detail, he may require such further particulars as may be necessary.

18. The district surveyor may, for the purpose of due supervision of the building and at the expense of the owner of the building, cause any pillar to be drilled at any point to ascertain its thickness, and may cause to be made any other tests he may consider desirable.

19. Any person dissatisfied with any requirement of the district surveyor under this section may appeal to the Tribunal of Appeal.

20. There shall be paid to the district surveyor by the builder or the owner in respect of every skeleton frame building, at such time as the drawings are deposited with the district surveyor, a calculation fee : such fee shall be in addition to the fee payable under section 154 of the principal Act, and shall be according to the following schedule :— (*See recommendation supra, p. 188, on Steel Construction.*)

APPENDIX C.

SUPPORTS UNDER SUPERSTRUCTURES.

In all buildings there shall be on all street frontages, piers, or other supports of stone, granite, brick, metal, or other approved materials, from the level of the ground to the level of the main wall of the superstructure above the ground, mezzanin, or first floors, of a total breadth on each street frontage equal to the following :—

On frontages up to 20 feet wide, one tenth part,
" 20 to 30 feet wide, one ninth part,
" 30 feet wide and over, one eighth part

of the respective widths of such frontages.

No piers or other supports shall be placed further apart than 30 feet measured from centre to centre of such piers or other supports, and no single pier shall in any case be less than 15 inches on the face other than those at party walls, which may be not less than 9 inches on the face and placed opposite the centre of such party walls. Such piers shall not be covered with mirrors or otherwise concealed.



THE BIOLOGICAL DISPOSAL OF SEWAGE FROM ISOLATED BUILDINGS.

By Professor FRANK CLOWES, D.Sc.

Read before the Royal Institute of British Architects, Monday, 15th February 1904.

INTRODUCTORY.

THE present Paper deals with the application of the biological method of treatment to the sewage from the new colony established at Horsham in the buildings erected by Messrs. Aston Webb, R.A., and Ingress Bell. When asked by Mr. Webb, at the suggestion of Dr. Armstrong, to recommend a means of inoffensively disposing of the sewage from Christ's Hospital, the experience derived from several years' biological treatment of a portion of the London sewage led me unhesitatingly to recommend the erection of a plant precisely similar to that used in the London experimental work. It seemed certain that the treatment at Horsham would be simplified by the fact that the sewage is purely of domestic origin. It accordingly contains no water derived from rainfall or surface drainage, and no road detritus or other matters which are not present in house drainage. Even the laundry refuse-water is excluded from this sewage, an arrangement which is probably not altogether in favour of the biological method of treatment, since the alkalinity caused by soap appears to favour bacterial action.

The system adopted consists in passing the sewage slowly through a depositing, or so-called "septic," tank, and allowing the outflow from this tank to be dealt with intermittently in coke-beds. The effluent from the tank, after having been treated once in the coke-bed, passes into a running brook, flowing as a matter of convenience over a short stretch of grass-land on its way.

EXPLANATION OF BIOLOGICAL TREATMENT AND OF THE METHOD OF ADAPTING IT.

It may be explained that the general advantages secured by the so-called biological or bacterial method of treatment are that it secures an inoffensive and non-putrescible effluent, and at the same time largely reduces the amount of sediment or "sludge" from town sewage which has to be disposed of; in the case of domestic sewage it even removes the sludge altogether.

Many kinds of living organisms undoubtedly take part in the changes brought about in this process of purifying sewage; hence the term "biological" or "natural" has been applied to the treatment. Since, however, the excessively minute vegetable organisms known as bacteria constitute by far the largest proportion of these useful organisms, the treatment is frequently termed "bacterial." The bacteria are actually present as organisms and as living spores in the sewage itself, and require to establish themselves in the purifying plant before the treatment becomes efficient. The improvement noticeable in the purification as

the tank and coke-beds mature is probably explained by the fact that the bacteria gradually accumulate and accommodate themselves to the conditions under which they are placed.

It has been found that many species of bacteria are concerned in the process, and that some, acting anaerobically, or in the absence of air, play their useful part in the settling or "septic" tank, whilst others, which require to be freely supplied with air and are therefore termed "aerobic," complete the purification in the subsequent coke-bed treatment. The sewage is prepared by the preliminary passage through the septic tank for the final purification in the coke-beds. It is in the septic tank that the solid fecal matter is resolved by the bacteria into gaseous and liquid substances, and it is here that the suspended solids disappear. It has been stated that the liquid should be secluded from contact with air during this preliminary treatment, but in order to secure this it is unnecessary to cover the tank, since the solid matters float as a protective scum and prevent the contact of the liquid with the air; and even when this scum is removed by wind or by rain the bacterial action is apparently not seriously affected. The complete closing of the tank is attended with some danger, since the gas produced is inflammable, and the introduction of a spark or flame into the inclosed space might therefore be attended with fire or explosion.

The final treatment in the coke-beds in the presence of air, constituting the so-called aerobic treatment, is mainly brought about by species of bacteria different from those concerned in the preliminary aerobic treatment, although some bacteria exist which are termed "facultative" because they have the power of adapting themselves to either aerobic or anaerobic conditions.

There are two recognised methods for exposing the sewage liquid to the action of aerobic bacteria. The "continuous method" provides for the liquid which overflows from the septic tank being continuously sprayed over the coke-beds, through which it constantly trickles and then flows away; whilst the "intermittent method" provides for the coke-bed being filled with the liquid, and then drained away after it has remained in the bed for a few hours.

The beds used in the continuous method are usually deep; they are made of large, hard material, and should be open at the sides; they possess the advantage of not requiring the constant services of an attendant for opening and closing the valves; but the final effluent from these beds must be subjected to sedimentation, since it contains much black humus-like suspended matter.

The beds used for the "intermittent treatment" are usually made of smaller material, since they have been found to be more efficient when filled with small coke than with large; they have been made of any depth up to thirteen feet.

Both these methods, when properly arranged and worked, yield a perfectly satisfactory effluent, and one or other should be chosen, according to the conditions under which the sewage is to be purified; probably where the fall of ground is sufficient the continuous treatment would frequently have the preference. In the present case the intermittent method was recommended because the writer had successfully worked it for many years, and at the time of drawing out the plans the continuous treatment had not been so fully experimented upon as at the present time, and could hardly come under consideration.

As regards cost of construction, this will naturally vary much with the style of work adopted. The plant for continuous treatment would probably be in most cases more expensive than that for intermittent, but on the other hand the cost of working it would be less. The extra cost of working the valves in the intermittent system is, however, usually reduced by the fact that there is a man about the place engaged in other work who can attend to the valves, and it is also quite possible to make the action automatic.

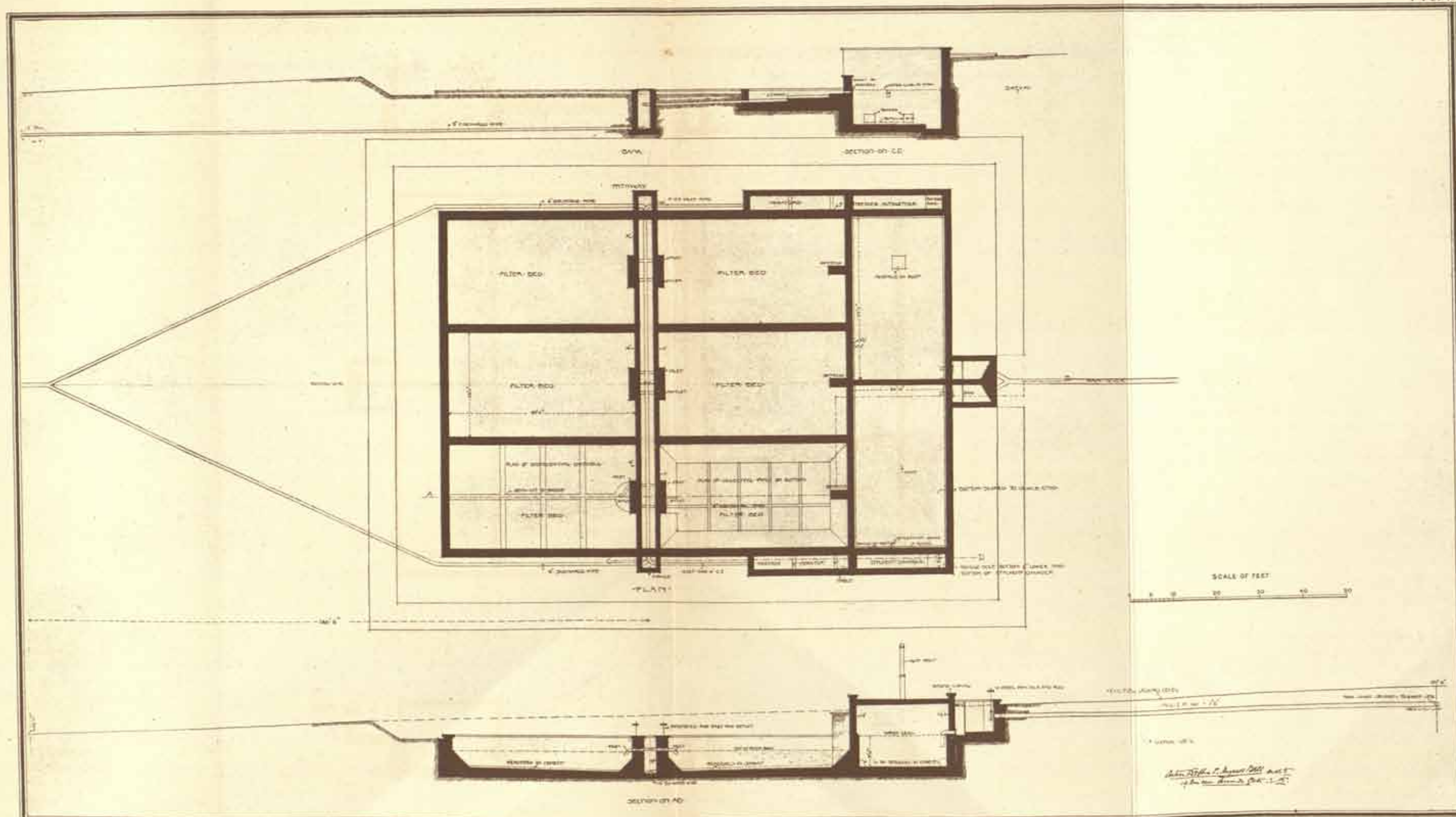
In calculating the capacity of the coke-beds for the intermittent system, it may be stated generally that the liquid capacity of the tank is reduced by about 50 per cent. by being filled with coke fragments. The capacity after the coke has been introduced, however, continually decreases for a period after the bed has begun to receive sewage, owing to the growth on the coke surface of a gelatinous film. The growth of this film is essential, as it includes the active bacteria; it further possesses the useful property of absorbing atmospheric oxygen when the bed is empty, and giving it up for purifying purposes to the sewage liquid which is subsequently introduced. The average working capacity of a well-managed bed, after the capacity has become stationary, may be put down at about 25 per cent. of the original space before the introduction of the coke.

It may be noted that the cooling of the sewage by frosty weather somewhat reduces the activity of the purifying organisms, although they continue to exert some purifying effect even in a liquid which is frozen on its surface, and they survive even after the liquid has been entirely frozen. Indeed, it has been shown that bacteria survive after exposure to the extremely low temperature of liquid air. But the fact that low temperature tends to render the biological purification less rapid tells in favour of the intermittent treatment during cold weather, since the spraying of the liquid through the air in the continuous treatment tends to greatly reduce its temperature.

In designing a plant for intermittent biological treatment, it is usual to assume that the water supply amounts to 30 gallons per head, and that the supply calculated on this basis represents the sewage flow to be arranged for. The septic tank should have a capacity of one day's flow, and the coke-beds collectively should be able to hold a two days' flow, their depth being determined by local conditions. It is assumed that the beds will receive two fillings in twenty-four hours, and that their working capacity will be 25 per cent. of the space which is afterwards filled with coke.

GENERAL RESULTS OBTAINED.

Before describing the construction of the plant and the method of using it, it may be stated that the treatment has now been in operation for over eighteen months, under the general charge of Mr. Streeter, of the works department, and has been worked by his man. Mr. Streeter reports that no hitch has occurred in the working of the plant, and that on one occasion only has any offensive smell arisen from the treatment. On examining into the cause of this smell, I found that it arose from stagnation of the process during the first lengthy school vacation. In the treatment of London sewage no intermission of flow occurs, but in a teaching establishment the sewage-flow almost ceases during vacation time. The first school vacation accordingly taught us that some means must be adopted to prevent the sewage from remaining unduly long in the septic tank, an occurrence which was new and unforeseen. The stagnation of the septic tank led to the production in the sewage of a large amount of sulphuretted hydrogen, and this foul gas was freely smelt when the school resumed its work, and the liquid in the tank was accordingly displaced. The liquid in the tank was not only offensive in smell, but it also undoubtedly upset the bacterial action of the coke-beds; it was, therefore, of a wholly objectionable nature. Attention is specially drawn to this occurrence and to its cause, because it probably explains why similar installations for the treatment of sewage from isolated buildings have become offensive. The plant should receive a flow of sewage which is sufficiently regular to prevent lengthy stagnation; and such stagnation might probably be obviated in all cases, as it was obviated in subsequent vacations.



CHRIST'S HOSPITAL, HORSHAM. PLAN OF SEPTIC TANKS.

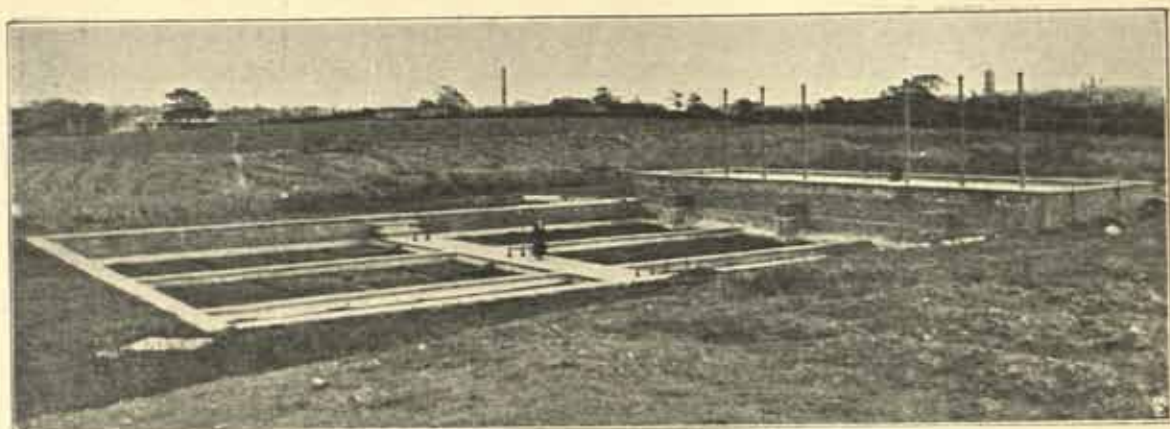


FIG. 2.

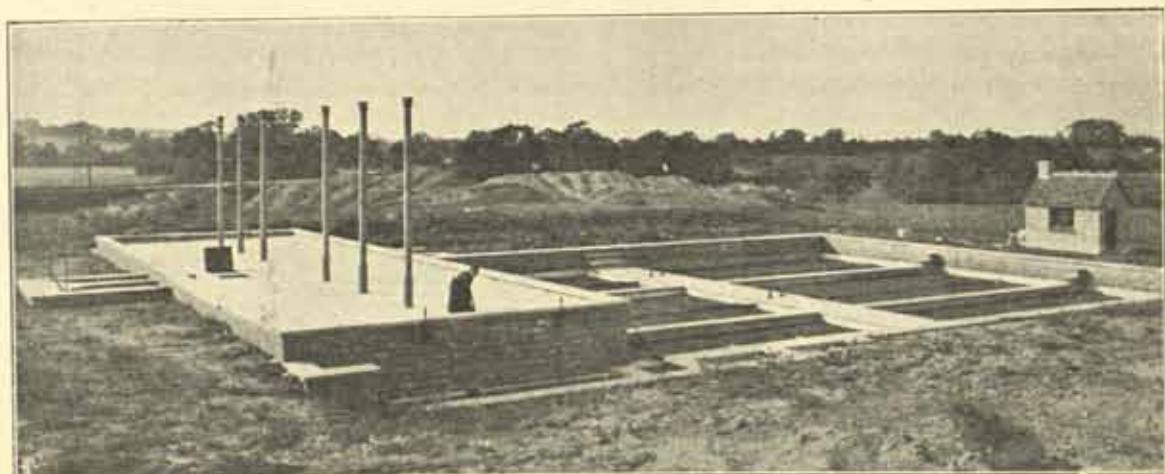


FIG. 3.

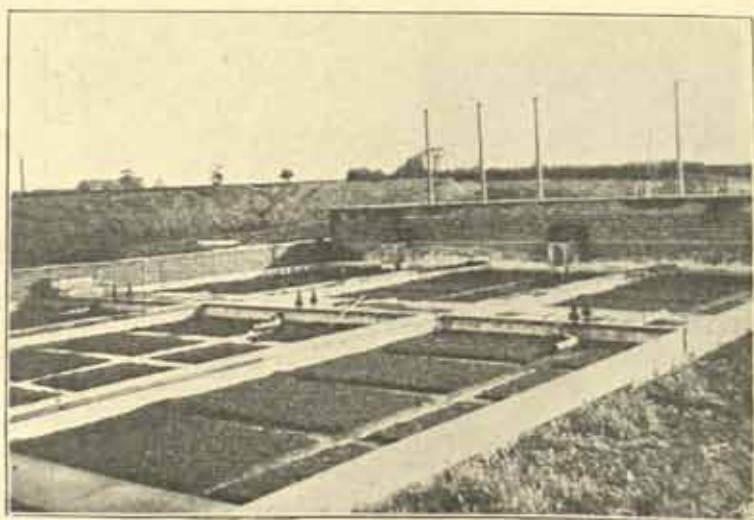


FIG. 4.

sewage derived from any isolated building without giving offence. It is also certain that under proper management the sewage effluent which it discharges will be innocuous to fish, and will not become offensive in itself or when it is discharged into a watercourse. It will be understood that proper management implies a certain regularity of working, which might doubtless be largely automatic in its nature.

DETAILS OF CONSTRUCTION AND TREATMENT.

The accompanying drawing of the plan and section (fig. 1) has been kindly furnished to me by Mr. Webb.

In planning the construction of the plant it was assumed that the amount of sewage to be dealt with would be thirty-five gallons per head of those resident at the school, and that the number of residents would be one thousand.

The sewage flows by gravitation into a small receiving chamber, and passes through a coarse screen into the "septic" tank. This tank is constructed in duplicate, each part being capable of retaining a twenty-four hours' flow of sewage. As a precautionary measure these tanks were covered in a substantial manner, and were provided with tall vertical ventilating shafts similar to those employed for the ventilation of sewers. This precaution has proved to be unnecessary, as far as the prevention of nuisance is concerned; but the protection thus afforded against wind and rain has been undoubtedly advantageous.

The roofs of these tanks may be identified in the accompanying illustrations (figs. 2, 3, 4) by their ventilating shafts. The tanks were formed by excavating the soil, and were then built in brick and rendered inside with cement. It was thought well to construct the tanks in duplicate in order to provide for accident or for the necessity of repair, and to allow a tank to be thrown out of work for the removal of sediment or "sludge"; the necessity for the removal of sludge, however, does not seem likely to arise, since the low-level tanks for receiving the "sludge" have not as yet been called into use. Both the inlets and the outlets of the tanks consist of elbow pipes, the ends of which are beneath the surface of the liquid within. The solid faecal matter rises to the surface of the liquid, and the arrangement of the elbow pipes not only insures that this matter shall remain in the tank during its dissipation as gas and liquid, but also that it shall not be disturbed meanwhile by the flow of the liquid. It may be stated that advantage has been thus far obtained by the possession of duplicate tanks, since they have been worked singly and alternately, and a longer period for the disposal of the solid faeces by bacterial action has in this way been secured.

The effluent passes from the septic tank by an exit, which is indicated by the boy in fig. 3, and flows along an open channel on its way to the coke-beds. This channel is seen beside the tank and bed in the illustrations. It was constructed in a succession of steps, so that the liquid, by falling over weir-walls, might be freed from much of its dissolved gas and might become aerated. This aeration has since been more fully secured by letting the effluent fall through perforated trays before passing over the weirs.

From the culvert the liquid flows into a tank filled with small graded hard coke, known as "pan-breeze," which has been sifted free from dust. The liquid is distributed over the coke surface by flowing along branched "grips," which are excavated in the surface of the coke: these are well shown in fig. 4. The grips are lined with fine coke, which serves to filter off the coarser particles, and to prevent them from getting into the bed. This fine coke is raked off at intervals and replaced by similar fresh material. As soon as the coke-bed is full to the upper surface of the coke, the flowing liquid is diverted into another similar bed. The bed is then allowed to stand full for two hours, after which the liquid contents are allowed to

flow away through drainage arrangements provided on the floor of the tank. This liquid constitutes the purified sewage effluent.

The tanks for containing the coke are constructed in a similar way to the septic tank, but they are not covered in. They have square drainage channels provided in their floors, which are covered with perforated iron plates. Six of these coke-beds are provided, and they are used in succession, as has been indicated above. Three of them are filled and emptied each day, the liquid remaining in the bed for two hours, and the bed being allowed to stand with air in the interspaces of the coke after its liquid contents have been discharged. Two of the remaining beds have their inlets and outlets opened and receive the effluent from the septic tank passing continuously through them from 5.30 P.M. to 6.30 A.M., a period during which the flow is naturally very slow. This passage of effluent serves to maintain the proper bacterial condition of the coke while the bed is not doing duty.

Each coke-bed in this installation is doing very easy work, since it has been found possible in treating London sewage to fill a bed three times in twenty-four hours over long periods, and to obtain satisfactory results: the treatment has even been pushed to four fillings per twenty-four hours. It is well in any sewage plant to have some reserve beds, since a bed may occasionally require to rest for a day or two after being emptied, and it may also require to be laid up for repair.

Since the bacteria and other organisms which effect the purification of the sewage are derived from the sewage itself, and require some time for their full establishment in the septic tank and in the coke-beds, it is found that the amount of purification produced by a new plant increases for a considerable period, and that, so far from the tanks requiring renewal or cleansing, they become increasingly efficient as their age increases if they are worked with regularity and are left undisturbed.

As has been already stated, the purification has generally been attributed to various species of the simplest forms of vegetable organisms known as bacteria. Other organisms, however, undoubtedly contribute towards the result, and the process may therefore be more correctly termed the "natural" or "biological" treatment of sewage. No chemicals whatever are used during the treatment, and the process is identical with that which occurs in the treatment of sewage on the land in sewage farms. The biological plant, however, possesses the advantages that it causes no offence, and that it requires less space and is more satisfactorily under control than the sewage farm. It compares favourably with the chemical processes of treatment, which can never effect economically a purification equal in degree to that secured by biological action, and which produce a much larger amount of sediment or "sludge."

My acknowledgments are due to Dr. Fowler of Manchester, and to Mr. J. W. H. Biggs, for their cooperation in planning the scheme of treatment; to Messrs. Aston Webb and Ingress Bell, for furnishing a copy of the plans ultimately agreed upon; and to Mr. Charles E. Brown, science master at the school, for photographs of the plant in action.

DISCUSSION OF PROFESSOR CLOWES'S PAPER.

The President, Mr. ASTON WEBB, R.A., F.S.A., in the Chair.

DR. GILBERT FOWLER, who rose at the instance of the President, said that he had a very small part in the initial stage of the installation at Horsham, and it was satisfactory to know that it was going on so well. There were a number of points he had thought of speaking about in connection with small installations which might perhaps be of interest to architects. First of all it occurred to him that architects were singularly fortunate people, in that for them, in large measure—it sounded paradoxical to say so—the sewage problem did not exist; for this reason, that the sewage problem had come to be pretty well a question of cost. There was no doubt that by modern methods it was possible to produce an effluent of any degree of purity up to potable water if necessary. He knew of an installation which was being considered now for a small town in the vicinity of St. Petersburg, where the Tsar was accustomed to go for his summer holidays, and where an outbreak of typhoid had made the inhabitants extremely anxious that the sewage should be efficiently purified. He understood that they contemplated there an installation something like that at Horsham, followed by sand filtration, and finally disinfection by ozone. Thus, when they were not tied by cost, they could do what they pleased. But, speaking more reasonably, there was no doubt that installations for country houses and comparatively small places, such as architects were frequently called in to deal with, might be made efficient without any serious question of cost arising; for this reason, that an addition of a few pounds to the cost of an installation might nearly double their factor of safety. It was well to have the largest factor of safety within limits that they could. Dr. Clowes had very properly emphasised certain limits that existed, more especially the size of the septic tank. There could be no doubt that it was possible to over-septicise sewage. The installation at Horsham was a case in point, and in the last report to hand from Massachusetts the Andover sewage tank, which had been reported on for several years there, had finally been put out of action, because it was definitely proved that sewage which had had a long, slow travel in the sewer, and finally a long sojourn in the septic tank, had become over-septicised, putrid fermentation had set in, and the sewage was more difficult to purify in consequence. He had a similar case under his own observation of a works which was laid down for a considerable district, and the sewage was admitted to the tanks when only a small portion of the district for which the work was constructed was actually coupled up;

the whole of the tanks were filled, the reason being that there was some apprehension, he believed, as to whether the walls in their green state would stand, and consequently the flow through the whole set of tanks was very slow, and there was a really terrible nuisance; and that was undoubtedly because the sewage was passing too slowly through the tanks, and there was in consequence a development of sulphuretted hydrogen. So there was a limit to the size of the septic tank, and it was possible, though not so likely, there might be some limit to the size of the beds. They had had a case—in Manchester, where they had only started a bed a few months—when owing to the construction works they had to stop it for several weeks, and they found it was practically a new bed when they started again. But he did not think that would have occurred in the ordinary way, if the bed had had time thoroughly to mature—but that was a moot point. Anyhow, it was well to have a good margin, as was the case at Horsham, where they needed only to fill the beds perhaps once a day. A case had come under his notice that might be of interest in regard to a country house, when he was asked in a friendly way to look through the plans, and he took care that there was this factor of safety. He wrote recently to the owner of the house to ask how he had got on—he had had three years' experience—and he said the effluent all through that time had passed into a little pond by a well-frequented roadway, and there had been no complaint whatever. The only difficulty he had had was that a certain amount of the scum had got into the exit pipe of the tank, but that they had readily met that. This gentleman had written to him (Dr. Fowler) in great distress once, thinking his tank had completely filled up with solid matter, and he (Dr. Fowler) suggested what had happened, which was also the case with Horsham, that most of the solids had floated up to the top and constituted a scum in which a considerable amount of very vigorous bacterial action was going on. He investigated it a little more thoroughly, and found that was the case. Immediately this leathery coating was pierced the water was underneath. He took out the excess of scum, threw it about on his lawn, and it all disappeared. That was practically all that had to be done to that tank, or cesspool as they would have called it in old days, for three years, and the effluent from that tank passed on to one of two cinder beds; they were only a few cubic yards in size altogether. In this case, as it would involve a certain amount of complication, it seemed better that the tank effluent

should be allowed to trickle continuously through, and this was done with an ordinary little perforated zinc tray. All that was done was that every day the gardener went down and turned the flow from one side to the other, and, having allowed a plentiful margin of cubic space in proportion to the amount to be dealt with, there was no difficulty in the purification. The whole difficulty came in when, as in the case of a great city like Manchester, they had to get the utmost out of every cubic yard of space—then they had to consider very carefully questions of cost right through. But little difficulties of distribution, or anything of that sort, were all neutralised if they had a plentiful margin of safety, and in most cases it could be readily allowed for in small installations at a comparatively insignificant cost. But, of course, while in the case of a country house an extra five-pound note might add 25 per cent. to the whole installation—if they came to work that out in a big town, it ran into hundreds of thousands, and that was where the difference came in. The cost of installations generally, of course, varied according to conditions. Whether they should have intermittent methods or continuous methods was very largely a question of condition, the fall available, and so forth. He believed, especially where they could have this margin, that the very simplest methods were always the best; that they could get quite as efficient results by some simple method of distribution, for instance, allowing, as Dr. Clowes had described, the sewage to just percolate through these grips, or through a certain amount of fine material through the surface, as had been done at Friern Barnet for years. Methods of that sort gave quite as good results, and were liable possibly to less accidental interference than more complicated mechanism. That was his own feeling, and that had been the conclusion come to by Professor Dunbar, of the Hygienic Institute, Hamburg, who had done some of the best Continental work on the subject, and with whom he had had a great deal of correspondence. The form of filter Dr. Dunbar recommended for small installations was made by about six to nine inches of fine material on the top, with rough coarse material underneath. The fine material gave two things: it gave distribution, and gave also what had come to be known as absorption—that is, an action of those beds which was not often referred to in English literature on the subject, but was undoubtedly of great importance. There was no doubt that the physical effect of the medium was of great importance, and that was why the question of the size of the medium had always to be considered. It was possible, by taking absolutely sterile clinkers of a certain size, and passing sewage through, to get a very considerable purification. Dyes and so on would be taken right out of solution by the purely physical absorption, and in the same way matters

like peptone and albumen, and so on, nitrogenous matters akin to those which occurred in sewage, were taken out wholly by the absorptive action of the medium. That very soon ceased unless a biological action succeeded, and then the absorbed matter was oxidised by the action of the bacteria, and there was also apparently a purely chemical oxidation—which was brought about by these beds owing to the physical attraction of the moist medium for oxygen. Professor Armstrong would be interested to know that it was possible by means of these beds to oxidise di-methyl aniline to methyl-violet, a reaction which in a laboratory required rather vigorous oxidising agents. If di-methyl aniline was put on the medium in good condition it was instantaneously oxidised to methyl-violet. He had been told that there were cases in Hamburg where they found this oxidation effect was of great importance in connection with the treatment of isolation hospitals, and he thought it would be a point of interest to this meeting. A difficulty often arose as to what was to be done with sewage which was specifically infected, say by typhoid from a typhoid fever hospital or any other infectious diseases hospital. Of course, the mere passing through these beds, it had been abundantly proved, was no real safeguard as regarded the removal of pathogenic organisms; but it had been found that it was possible to sterilise absolutely such sewage before putting it on to the bed by means of chloride of lime, and after such sterilisation it would be put on to a filter bed, more especially a percolating and thoroughly oxidising bed, and the chloride of lime was oxidised to chlorate, and the purification went on, if possible, more vigorously than without the presence of the chloride of lime. But sterilising agents such as carbolic acid would inhibit the oxidising and purifying effects of the bed. If chloride of lime was used it was possible, according to the Hamburg experiments, to sterilise the sewage and free it from pathogenic germs before putting it on the percolating filter or contact beds. For such work they preferred this simple form of percolating bed he was describing: first of all, a fine layer which served as an absorption layer, which arrested the finely suspended matters, and also a large proportion of matters in emulsion, as one might say, and then the liquid passing from that percolated through the coarse material and became thoroughly oxidised. He was told by Dr. Dunbar that about 50 per cent. of this change took place in this top six inches, and he believed the right use of the fine material on the top would help in many cases towards a very simple solution of very small sewage problems. He knew a little works at Clifton Junction, near Manchester, which was made by a sand top and coarse material underneath, which had been going with excellent results for twelve years, with just occasional scraping of the sand—that was all

that had been required; and such a method as that seemed to be excellently suited for small installations. In Manchester they had these grips on the top of the beds, and they removed quite a large amount of sludge from them from time to time, which was simply tipped as earth, and caused no nuisance at all, and the labour involved was not very excessive. He had had some costs got out—they had been very carefully going into the costs all the time—and up to the present time for the whole year they tallied very well, the last half-year with the last quarter. It came out at about 3s. a million gallons. Such figures of course were only of use if used judiciously. What could be done in a huge town with millions of gallons could not be done—the cost must go up *pro rata* very much—with a small installation. Still, the labour involved in occasional scraping of beds in either a small or a large installation was not at all excessive. The cost of construction varied according to the necessities of the case. Their little septic installation in Manchester, an experimental installation of about 20,000 gallons, cost them all through, with automatic gear and everything, something under £600; but he had heard of installations costing a good deal more. It all depended upon how the thing was done, on a variety of local conditions which always had to be taken into account. Should any questions arise in the discussion which he could throw any light upon, he should be pleased to do so.

Mr. HAROLD GRIFFITHS congratulated the Institute upon having so practical a Paper of such importance to architects read to them that evening. It might be thought by some architects of eminence that the disposal of sewage was quite beneath their dignity; but to those he ventured to point out that in his opinion every channel and artery necessary to complete and perfect the structure came within the scope and duties of the architect. No doubt sewage disposal which met the case very well thirty years ago was now quite out of date; for at that period, so long as the sewage was not in view, everyone appeared satisfied—but at the present time nothing less than a scientific disposal of sewage, such as described by Dr. Clowes, would suffice. There were one or two points on which he would like to have some little additional information. He was at present laying down a sewage scheme, exactly as had been described that evening, for a Surrey mansion, and the difficulty he had was that when the family were in occupation there was a considerable amount of sewage, but when only the staff were there there was only a tenth of that sewage—which made it somewhat difficult to proportion his septic tank and bacterial beds. As regards cost, the house had approximately seventy rooms, and housed about sixty people, and he was laying down such an installation, including the connections from the existing pipes, at a cost of

about £150, including the disposal of the effluent by perforated pipes entirely under the surface of the park land. It was a small system, but it was a small amount of money also. Would Dr. Clowes kindly tell them how long the sewage should remain in the septic tank before it flowed on to the bacterial or filter chamber? It had been stated that if it remained too long it became inert, and there must be a time when they could run it on the bacterial chamber before the proper chemical action had taken place in the septic tank. Coke had been mentioned as the best filling material. He should like to ask whether ballast was not as good. As to the size of the filling material, he had heard with some astonishment from Dr. Fowler that coarse sand on the top of the filling was a great advantage. It would be useful to have it stated that they could use sand with coarser filling material underneath for a certain number of inches, and it would be of great practical advantage to those present if the proportions and exact size of the filling material could be given. He should like to ask whether the process could be repeated twice in one day, and, if so, what interval should elapse between the irrigations; also, where there was little sewage for disposal, how many days they could go from one irrigation to another without destroying the bacteria in the chamber; again, what became of the grease from the washing up. In his scheme, which received the washings from the dairy vessels, it was proposed to run the grease into the septic chamber in the ordinary way, and he wanted to know whether it would be purified, or be likely to clog the filling material in the bacterial chamber. He understood that at Horsham they had thought proper to keep out the washings from the laundry, which would contain soapy and greasy matter. For a small scheme he would suggest that a perforated trough of oak would be much better for distributing the sewage over the bacterial chamber than the method adopted at Horsham. They might cut trenches, but it appeared to him that the sewage would immediately begin to sink down at the end of the chamber nearest the outfall, and would not reach the other end of the chamber except by coming up from underneath; whereas, if a perforated trough were adopted, it would distribute the sewage all over the bacterial chamber. He should also like to ask whether two hours was the proper time for the sewage to remain at rest in the bacterial chamber. He had always understood four hours; if he was incorrect he should like to be put right on that point.

Mr. F. J. WILLIS, Secretary of the Royal Commission on Sewage Disposal, said he had been very interested in the paper. It was through the work of Dr. Clowes and others like him that the Sewage Commission were getting their experience.

Mr. R. LANGTON COLE [F.] asked whether in an installation on a small scale, for an ordinary

country house, it was desirable or not to go in for one or other of the automatic processes in use. Then, as regards stagnation, what was the best method of getting over that difficulty, when a house was only occupied for a portion of the year? Was it safe to leave the ordinary beds with automatic arrangements to themselves, or should some special arrangement be made for dealing with the reduced flow?

Mr. E. PENFOLD [A.] said he was preparing a scheme of sewage disposal for a small isolation hospital where they proposed to have the automatic system, not the intermittent. He was surprised to hear from Dr. Fowler about its being rather doubtful whether the effluent would be safe. He should like to know how Dr. Fowler proposed the application of chloride of lime before the sewage passed into the septic tank.

Dr. ARMSTRONG, F.R.S., said that both the President and himself must greet Dr. Clowes's appearance there that evening with considerable satisfaction, inasmuch as they were primarily responsible for the suggestion that this system should be adopted at Horsham. As one of the governors of the school, he had had to consider very carefully the problem of disposing of the sewage. It was a difficult problem to face. Personally, however, after various visits to the outfall under Dr. Clowes's superintendence and guidance, he had very little doubt as to the desirability of adopting the scheme; but, although he had never before ventured to hint at such a thing, he thought the President was a trifle nervous at times; and, therefore, it must be a great satisfaction to Mr. Webb to know that the scheme did operate with such absolute success—for he believed that was the result of their eighteen months' experience with the system. Dr. Clowes had done everything he possibly could to assist them in this matter. He was sure the President would agree that the present was a proper opportunity on which to tender him their most grateful thanks for the assistance he had always so willingly rendered. From a scientific point of view this system of sewage disposal was one of extraordinary interest. In the first place, it was a justification of the old cesspool system. The cesspool had been got rid of; it was thought to be an abomination; but they were coming back to the cesspool, only on a larger scale, with the precaution not to draw immediately on the tank for their water supply! That was really the only distinction between the modern and the old system. In the old system the well and the cesspool were put side by side; they were now very careful to avoid having the well near the cesspool, although, perhaps, as Dr. Fowler had foreshadowed, they might even be prepared later on to drink sewage which had been properly dealt with by this system! When one considered what was going on in these tanks, the process would be seen to be altogether ex-

traordinary. The paper, he thought, illustrated first of all the difficulties under which the architect laboured in these times when he was called upon to be a master of all trades; and in the second place, it emphasised the importance of the architect receiving a thorough grounding in scientific method, and a thorough training in scientific knowledge.

Mr. OSBORNE SMITH [F.], in seconding the vote of thanks, said he should be extremely grateful to Dr. Clowes if he would tell them a little more about how the laundry refuse was got rid of from the washing for a thousand boys. He should like to know if it was turned on to the beds with the rest of the sewage, or whether it was treated separately. This was a serious difficulty, which was encountered by all who had to deal with houses in the country. There was another difficulty: at times the beds had to be put in such a position that they had to be covered, and he would like to know the exact effect of that. In some cases he believed it had a disastrous effect, and if that was the case he should like to know how it could best be met.

Mr. E. VINCENT KING [A.] asked a question about ventilation. He had been connected, he said, with a system up in the North which was carried out in quite a similar way at two infectious hospitals, but they had not ventilated their tanks. There was only a space of about four inches between the top crust and the under side of the cover of the tanks. They understood that in that crust the microbes were a kind of cannibals—that they ate one another when in so doing they got rid of the solid matter, and that ventilating the tank would destroy this action.

Mr. MAX CLARKE [A.], in supporting the vote of thanks, said that he had put up a small bacteria tank in 1893, but unfortunately at that time he did not know anything about the secondary or coke beds, so allowed the effluent to run from the tank along a trench cut in the ground, and that had been going on with very successful results. The installation was for a small house with accommodation for about six persons. He was discussing the details of this installation with a man last year who told him that he had just come from inspecting a very large installation of this nature for a public institution, and he said that the scum had grown right up through the drains and the soil pipe with such disastrous results that the whole system was blocked up. He had been unable since to find out anything more relating to this particular catastrophe, but he would like to know whether anything of the kind had come under the notice of Professor Clowes or Dr. Fowler.

A MEMBER asked what would be done in the case of a perfectly level site where they could not get a fall.

Mr. FRANK LISHMAN [A.] asked what effect

a severe and prolonged frost would have on the system.

THE PRESIDENT said he quite agreed with Mr. Griffiths that architects should keep up with the science of the disposal of sewage as much as with any other part of their intricate and elaborate work. It was partly owing to Dr. Armstrong's suggestion that this principle of sewage disposal was finally adopted at Horsham; it was also at his suggestion that they were fortunate enough to get the help of Dr. Clowes in carrying it out; and it was at Dr. Clowes's suggestion that they were fortunate enough to have further help from Dr. Fowler. They were under great obligations to these three gentlemen in this particular matter; and although he felt he must apologise for a second evening being devoted to this particular school, still, when he found that Dr. Clowes was willing to give them a description of the work done there in sewage disposal, he thought he should not be doing the Institute a good turn if he did not encourage him in his kind willingness. They had rather a difficult task at Horsham, because the nature of the land there was not suitable for the disposal of the sewage over the land, though Horsham itself had tried that principle—in fact, it had a sewage farm not very far off. It was a first essential that any effluent which passed from the school buildings, which had over a thousand occupants, should be as pure as it possibly could be. It was a test of its success that for eighteen months that effluent had been passing away without any complaint, or any cause of complaint, from anybody who resided in the district. Before this work was started Dr. Clowes had been kind enough to take him down the river on a beautiful sunny day. They spent a long time at Barking, and certainly the effluent he saw there pouring in its tons into the Thames was a very different effluent from that discharged from the sewage treated on the method under discussion. Some time ago he had the advantage of hearing Dr. Clowes on a similar subject at the Royal Institution, when he said that these bacteria could be subjected to an extraordinary amount of heat without their vitality being affected in any way, but that when they were exposed to the rays of the sun they turned up their feet and died at once! That had always struck him as a wonderful example of the great healing and beneficent effect of the sun's rays. And that was one of the principles they had acted on at Horsham; to call in the sun in every possible way to preserve the health and strength of the boys who lived there. With regard to private installations, which, as Dr. Fowler said, must come so often under the notice of architects, he had found exactly the difficulty mentioned by another speaker, namely, the difficulty of the unequal flow through these small installations. In one house he had an auto-

matic system which was supposed to throw the matter first on to one bed, and when that bed was full on to another, and so on, and it worked very well up to a certain point; but when the house was full of visitors, and there was an extra number of baths or an extra amount of water used, the automatic system failed altogether. Whether that could be improved or not he did not know, but it was certainly one of the things they must look to these gentlemen to for assistance. Before putting the vote of thanks, he should like to say how very much indebted architects must always be to the scientific men who took an interest in these things. Architects did not profess to be experts in such matters; they must call in, and every wise architect would call in, men who were experts to advise them before they adopted measures at the expense of their clients, which was a very serious thing. Therefore it was that they were so much obliged when these gentlemen came amongst them and explained these matters to them.—In putting the vote of thanks the President said he was sure the Institute would wish to include in the vote Dr. Fowler and Dr. Armstrong.

DR. FOWLER, asked by Dr. Clowes if he would give shortly his experience with regard to automatic arrangements, said it was a somewhat delicate question on which to speak publicly, because there were a great number of these automatic apparatus, each one of which had some special feature; so that his remarks would be of a general character. The economic use of the automatic gear depended, he thought, upon the amount of labour that could be saved. If they could save practically all labour, and dispense with the men entirely, then they saved 100 per cent. on labour; but if their installation got bigger and bigger, and they were bound to have a number of men about, then the apparent use of the automatic gear became less and less. He personally had at one time, and still had, a great wish to see everything done as cheaply as possible by machinery; but when it was found that quite a large area of beds could be controlled by one man, the game seemed hardly worth the candle; and it came to this, that the question was not really a question of the area to be controlled, but of the flow to be controlled at a given moment. There might be, as there was, for instance, at Manchester, altogether seventy-two acres to look after; but there were only 1,000,000 gallons per hour to look after, and one man or two men could very easily distribute that amount of water round the works by means of sluices. It was not as if the whole twenty-six or thirty million gallons came down at once. He remembered, in the early stages of the Manchester scheme, they were told they would want about a thousand men rushing about opening and shutting sluices for their lives! But that was not the case at all, for the reason that only a certain limited amount of water came down at a

given time. If all the beds were supplied with expensive machinery, a very large proportion of the plant would simply be lying idle the greater part of the time. But in all these cases the economic mean had to be found, and he was sure that any automatic gear adopted must be of the very simplest. It was possible to devise extremely ingenious and highly intricate arrangements of siphons and tubes and what not, which would act extremely well if one had clear water, and were only concerned with putting clear water from one tank into another. But sewage was a different thing. Not only did it contain matters in suspension, but, what was of even more importance, it produced a growth in pipes through which it flowed without access of air. Any one without experience would hardly realise what it could amount to. He had seen a pipe about three inches in diameter through which an uninterrupted flow of effluent passed which had become completely blocked with a liver-like mass of sewage fungus; and in a smaller degree all pipes through which sewage flowed without access of air were liable to these growths of various organisms with long names which he was not altogether familiar with, except in bulk.

THE PRESIDENT: That accounts for the case mentioned by Mr. Max Clarke, I suppose.

DR. FOWLER: That, I take it, was a case similar to the one I have mentioned, where the actual scum in the tank grew to such a point that it blocked up the outfall. It was quite conceivable for it to go up the soil-pipe. For want of air they got an actual growth. On the sill of the septic tank would be seen long fronds of this fungus that would grow. Any automatic gear adopted should be free from small pipes, or anything which could get out of order; it should be something of the very simplest—a mere tipping bucket, or something of that kind.

DR. CLOWES, answering other questions put during the discussion, said he was asked how he proposed to provide for the state of things in the absence of the family altogether from the mansion, when the sewage was reduced to a very small amount compared with that which usually passed. He had mentioned in his paper that at Horsham they were at first very much troubled by the fact that the flow almost ceased in the first year during the Coronation holiday, and that they were only able to meet the case by turning some of the water supply through the whole system. The flow was trivial compared with what they usually had, and they found it absolutely necessary to supplement it. That was the only way they could suggest its being dealt with. Dr. Fowler, he thought, was suggesting something else.

DR. FOWLER: I was only thinking whether, in cases where there was great variation in the course of the day, it was possible to allow the sewage to pond up to some extent in the tank,

and let it flow away afterwards by some arrangement of the ball-tap type. I think I suggested something of the kind in that little country-house installation I was speaking of.

DR. CLOWES: Then a question arose as to the length of time which the sewage should remain in the septic tank. He believed Dr. Fowler would agree that it was unwise to allow the sewage to take longer in its passage through the tank than twenty-four hours; very shortly after that it began to undergo the foul putrefactive change which he referred to, and it would then certainly lead to the tank becoming a nuisance. They had had septic tanks at work for many years in experimental installations at two of the London sewage outfalls, where they had given only six or seven hours for the passage of the sewage through the tanks; but, of course, London sewage was in a different condition from the sewage of these isolated buildings, since it had been many hours on its passage to the outfall, which was far distant from the town, and therefore it had already undergone a certain amount of this septic change; but generally more than twenty-four hours was highly undesirable. As regarded material for filling the bed they found nothing was quite so efficient as coke. Ballast had been used successfully; hard clinker from boiler furnaces, broken brick, and the broken "saggers" or rough clay vessels in which potters burnt their ware had been also very successfully used, but none of them gave quite as good a result as coke. With regard to the spacing of the two fillings per twenty-four hours, ideally, of course, those two fillings should be separated as widely as possible; but, as a matter of convenience, it was generally found that they took place during the daytime, because it was not economical to have a man kept late in the night in order to place the second filling at its proper time. With regard to the necessity of feeding the bacteria at regular intervals, it was not absolutely necessary to supply them frequently with nourishment. For long periods, say, either a week or a fortnight, the passage of drinking water through these beds seemed to maintain them in condition; that is to say, they began their efficient action directly the sewage came in after they had been supplied in this way with water. Possibly the bacterial organisms themselves survived, as there was probably a sufficient remnant of sewage matter in the bed to maintain them; he should think it was likely that in that case the spores also came into action after a time. The grease would disappear entirely in the septic tank—that is, it would rise with the other solid matter that formed the scum, and in that scum it would be dealt with efficiently by the bacteria; and, as was stated in the paper, it would even aid the bacterial action by the alkali of the soap, the ordinary form in which the grease was introduced. The greasy soapy matter from the laundry at

Horsham was separately dealt with, he believed, by passing the water through vessels filled with common flints; the soapy matter apparently adhered to the surface of the flints, and was ultimately removed by bacterial action. The liquid which passed away, freed from soap, did not go through the installation for treating the sewage, but flowed away separately.

THE PRESIDENT: The level does not allow of it.

DR. CLOWES: A speaker had suggested that a perforated oak trough might be better than grips, for distributing the sewage over the coke-beds, because the grips would not carry the liquid throughout the length of the bed. Of course, the proper distribution of the liquid by the grips depended upon the surface of the grip being covered with sufficiently fine material, and with a sufficient quantity of it. As a matter of fact, they had easily arrived at a system of working by which the liquid was sufficiently checked in its passage into the beds to ensure its even spreading over the grips. He had spoken of two hours as being allowed for aeration of the beds as the minimum interval between the times of filling. Two hours appeared to be quite sufficient, but there was no objection to that period being extended, as it often was, to ten or twelve hours or more.

MR. GRIFFITHS said he had asked whether the liquid should remain in the bacterial beds two hours or more.

DR. CLOWES replied that there was no doubt the main part of the purification was carried out in the first half-hour; more than 50 per cent. of the purification in their experience was effected in quite the earliest stages; but they generally gave about two or three hours, because a certain amount of purification went on during that interval; but after that there was practically no advantage obtained by prolonging the contact. He had been asked how they should arrange covered beds where covered beds would be necessary. He did not know for what reason they would be necessary.

MR. OSBORNE SMITH: Supposing the site was so limited that the occupants of the house would be annoyed by the smell of the beds?

DR. CLOWES: But these beds do not smell; neither the septic tanks nor the beds smell. If there were any question of hiding them, there could be no objection to a loose cover open freely at the edges. The coke beds must have aeration, and must not be shut off from the free access and circulation of air.

MR. OSBORNE SMITH: Must they not be shut off from the sun?

DR. CLOWES: It had been suggested that the sun would stop the action, because it was inimical to bacterial life; but the bed is completely opaque to light, and the sun did not penetrate the bed: any effect of sunlight was entirely superficial.

Dr. Fowler had referred to the scum stopping the outlet. He believed the scum might do it as well as the fungus growth he referred to; but Dr. Fowler mentioned himself that, in case the scum did actually stop it, it could be simply mechanically removed. They had never had a case of a pipe being choked with scum. At Horsham it might conceivably have happened, because the scum became very thick when they ran one tank for a long period; but the man was told to probe the scum, and ascertain its thickness, and, if it was getting anywhere near the entrance or exit of the shoulder pipe, to at once turn off the sewage supply from that tank and to allow the sewage to flow into the other one; and in that way they had never had any trouble from scum entering the inflow or outflow pipe. When an absolutely level site had to be used, pumping must be resorted to. He was afraid there was no way out of it; they could not break through the laws of nature with regard to gravitation. Frost was really not troublesome, in the sense that one speaker seemed to suspect. A sewage farm was, of course, frequently thrown entirely out of action by a severe or long-continued frost, since the soil became frozen solid, and no purification went on. But he did not think that anyone with experience of these beds had ever seen frozen beds; they had always been used throughout severe winters. Although there had been no very severe frosts lately, he remembered, during a severe winter at Bristol, looking at some beds which had a thin skin of ice over the surface, but everything was going on in a perfectly regular and normal way; the ice did not extend to the filling point, for the simple reason that sewage liquid has a temperature considerably above freezing point. The temperature of London sewage was never below 56° F., and he should doubt if liquid carried by underground pipes could ever fall to anywhere near freezing point; so that there was constantly a comparatively warm liquid coming into the bed, and the mass of the bed was kept entirely open.

MR. E. B. PIKE: As chemist in charge at the northern outfall for the London sewage, may I say that one winter the large acre coke-bed was covered with a thin sheet of ice for several weeks, and the only effect noticeable was a slight lowering in the quantity of nitrates produced during the purification, which proceeded uninterruptedly and satisfactorily?

DR. CLOWES, continuing, said he believed it never had occurred in any case that the bed had been blocked. It might be useful to state that the London sewage occasionally contained much salt water, and that this had not been found to be in any way prejudicial to the process of biological treatment. Direct experiments had also been made with the object of comparing the facility with which the purifying bacteria lived and multiplied in sea-water and in fresh water. No differ-

ence was noticeable, and it may be assumed therefore that sea-water is in no way prejudicial to the treatment. The President had been good enough to thank him and Dr. Fowler for the part they had taken in connection with this matter; but, personally, he was glad to have had an opportunity of putting up a small plant which he could further watch, as, after working for some years at the London outfalls, the results arrived at were final, and the treatment had passed the experimental stage. He should like rather to thank Dr. Armstrong and Mr. Webb for the opportunity which they had given him of having a small plant which he could continually observe, and from which he could still learn many useful lessons.

MR. D. J. EBBETTS, Engineer to the Acton Urban District Council, who had received an advance proof of Dr. Clowes's Paper, sends the following notes:—

In my opinion, the treatment of drainage from isolated buildings in the country should commence with a septic tank. I do not see any need, in such cases, to make the septic tank in duplicate, but I should construct two small detritus tanks—only one of them, of course, being used at a time; and from the detritus tank grit, sand, &c. &c., could readily be removed when the necessity arises. I think it quite unnecessary to cover in such septic tanks, and would point out that it is not always necessary to construct expensive walls and floors to form the septic tank. It depends, of course, upon the level of the tank in regard to the ground, and on the nature of the soil. For instance, in a chalk soil, excavation can be made and its side and bottom can be cemented, forming a very suitable tank; or if the soil is clay, or even a stiff soil where clay can readily be obtained, the excavation can be made in the earth and lined with puddled clay.

As to the effluent from the septic tank, I hold that there are three ways at least in which it can be treated satisfactorily:—

- (1) *By broad irrigation.*—Where a small farm is carried on in connection with an isolated country house, this system can very well be adopted—supposing that intelligent management and direction is available. In such a case, it seems to me that this is the best and most satisfactory means for the disposal of the tank effluent.
- (2) The tank effluent can be taken in a small underground chamber with an automatic siphon discharging its contents into a network of unglazed pipes below the level of the grass. This is a very admirable way of disposal, it is quite out of sight, and practically requires no attention at all. The automatic siphon may be expected to last a great number of years with abso-

lutely no attention, although, as a matter of precaution, it should be inspected from time to time.

- (3) The effluent from the tank may be taken to a filter. For my part I hold that the filter should be an aerobic filter. It seems to me that it is a more scientific and successful way of treating the effluent, and if one looks at the opinions expressed by those who have experimented for a long time with such filters, I think one can only arrive at the conclusion that aerobic filters are destined in a short time to take the place of the contact filters which are in many places now in use.

The Royal Commission on Sewage Disposal will no doubt settle this point for us, and if we only live long enough, we shall some day be able to read their report.

One of the advantages of the aerobic filter is its very low cost. I cannot understand Professor Frank Clowes's statement that the plan for continuous treatment (aerobic filter) would probably be in most cases more than that for intermittent.

- 1 The aerobic filter is far smaller in size, and for this and other reasons is much less costly to instal, and requires less attention when installed, while there certainly is no difficulty in times of frost.

The contact filter which Professor Clowes refers to is a watertight tank, which has to be constructed and filled with a filtering material, with special drainage channels at the bottom, &c.

The aerobic filter simply consists of a heap of filtering material freely exposed to the air, which may be of any shape or size. It can be shot down on the ground if the levels of the adjoining surface allow of its being so placed, or an excavation can be made in the ground, and the heap can be piled up in the centre of the excavation. The bottom surface of the excavation should of course be made with slopes, so as to throw off the water; but no special under-drainage arrangements are required.

Much expense is often gone to in providing patent distributors to supply the tank effluent to the aerobic filter, but I do not find any necessity for an expensive arrangement of this kind. Very simple troughs for feeding the liquid are all that is required.

Generally, I would point out that it is not necessary to go to any great expense in carrying out such works. Very often tanks and filters which are in use in such works are of a much more costly nature than in my opinion there is any need for.



9, CONDUIT STREET, LONDON, W., 20th Feb. 1904.

CHRONICLE.

L.C.C. By-laws relating to the Deposit of Plans &c. with respect to Drainage Work.

The Council have had under their consideration the two letters printed below, and desire to inform members that they endorse the views therein expressed. A letter embodying these views is being sent to the Local Government Board, the London County Council, and all the Metropolitan Borough Councils.

4, Queen Square, W.C., 16th November 1903.

To the Editor of the JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS,—

DEAR SIR,—In August 1899 the Metropolis Management Acts Amendment (By-laws) Act was passed (62 & 63 Victoria, chapter 15) giving the London County Council power to make by-laws with regard to the deposit of plans, sections, and particulars of certain drainage work, a portion of section 2 of this Act being as follows: "Requiring persons about to construct, reconstruct, or alter the pipes, drains, or other means of communicating with sewers, or the traps or apparatus connected therewith, to deposit with the Sanitary Authority of the district such plans, sections, and particulars of the proposed construction, reconstruction, or alteration as may be necessary for the purpose of ascertaining whether such construction, reconstruction, or alteration is in accordance with the statutory provisions relative thereto and with the by-laws made under the said section."

These by-laws have now been made, were approved by the Local Government Board 20th August last, and are in force at the present time. I enclose a copy herewith, as I think they are of such importance to architects practising in the Metropolis that they should be published in the Institute JOURNAL, with some notes calling the attention of members to what they will be expected to provide in the way of plans and particulars of the proposed work. At the present time the remuneration of architects for this class of work is limited, many persons considering the Institute scale of fees should apply.

If it is the case that architects must, before having sanitary work approved by a sanitary authority, submit plans in duplicate showing "every floor of any building in connection with which such pipes or drains are to be used, and the position, form, levels, and arrangement of the several parts of such building, including the roof thereof, and the size and position of every drain, manhole, gully, soil pipe, waste pipe, ventilating pipe and rain-water pipe, and of any drain passing under such building, and the position of every bath, water-closet apparatus, slop sink, urinal, lavatory basin or apparatus, sink (not being a slop sink), and trap in connection with the foregoing" (clause 2); and also "show thereon the position of all windows and other openings into the building, and the height and position of all chimneys belonging to the building within a distance of twenty feet from the open end of a soil pipe and ventilating pipe" (clause 3), and also a block plan showing the properties and streets adjoining—if this be the case, it seems to me a complete set of drawings of the buildings will in all probability be required, or at any rate can be insisted upon.

I think it should be made clear to our clients that the above work cannot be done for the usual fees, and also that it has been required by the powers that be without reference to architects at all.

I also consider that the Institute should enter into communication with the various "sanitary authorities" for the purpose of ascertaining what construction they put upon these by-laws.

It has already been suggested that the authorities should not accept sun prints for these documents, which seems an unnecessary restriction, as sun prints on linen are, as far as we know, indelible enough for all practical purposes.

One point in connection with these new by-laws it seems to me should be settled by the Institute without delay—viz., do these by-laws, and the various drawings required by them, come within the clause in the R.I.B.A. Form of Contract which requires the contractor to give all notices and pay all fees, as the words "Acts, regulations, or by-laws" are used in the clause; or is it open to the architect to insert in the specification that the contractor shall include the sum of £ to cover the cost of copies of specification and drawings to be paid to the architect's instructions?

It is the case that regulations are in force in New York and other great cities similar to those in question, but I am not aware that they are so far-reaching in their requirements or involve such an amount of labour or expense as these might do in the hands of an irresponsible authority.

All the above points seem worthy of the immediate consideration of the Institute or its Council, with the object of making clear the duties of architects to their clients; the latter will, no doubt, be under the unpleasant necessity of paying a greatly increased sum, required in carrying

out these by-laws, whether it be to the architect or contractor.

If it is made quite clear who is to bear the cost, the less friction there will be on the subject, and the better will be the relation between the parties. —I am, Sir, yours faithfully,

MAX CLARKE.

The by-laws referred to are as follows:—

Construction of a drainage system as a whole.

1. (1) Every person who, in the provision of a drainage system as a whole, is about to construct the pipes, drains, or other means of communicating with a sewer, or the traps and apparatus connected therewith, shall deposit in duplicate with the sanitary authority of the district, at their office, such plans, sections, and particulars of the proposed construction as may be necessary for the purpose of enabling such authority to ascertain whether such construction is in accordance with the statutory provisions relative thereto, and with the by-laws made under section 202 of the Metropolis Management Act 1855.

(2) He shall cause such duplicate plans and sections to be clearly and indelibly made on a durable material to a scale (except in the case of block plans) of not less than one inch to every sixteen feet, and shall, amongst other things, show thereon every floor of any building in connection with which such pipes or drains are to be used, and the position, form, levels and arrangement of the several parts of such building, including the roof thereof, and the size and position of every drain, man-hole, gully, soil pipe, waste pipe, ventilating pipe, and rain-water pipe, and of any drain passing under such building, and the position of every bath, water-closet apparatus, slop-sink, urinal, lavatory basin or apparatus, sink (not being a slop-sink), and trap in connection with the foregoing.

(3) He shall also show thereon the positions of all windows and other openings into the building, and the height and position of all chimneys belonging to the building within a distance of twenty feet from the open end of a soil pipe or ventilating pipe.

(4) He shall at the same time deposit in duplicate with the sanitary authority of the district, at their office, a detailed description in writing of the intended mode of constructing, jointing and fixing any such drain, man-hole, gully, pipe, bath, water-closet apparatus, sink, urinal, lavatory basin or apparatus, or trap.

(5) He shall at the same time deposit in duplicate with the sanitary authority of the district, at their office, a block plan of the premises upon which any such building is to be situated, or any such work is to be carried out (drawn to a scale of not less than one inch to every twenty-two feet), and he shall show thereon—

(a) The block plan of such building.

(b) The position of the whole of the buildings on the premises, and so much of the properties adjoining thereto as may be affected by the proposed work.

(c) The names of the streets or thoroughfares immediately adjoining the premises, and the number or designation of the premises.

(d) The difference of the level between the lowest floor of such building and the adjoining pavement.

(e) The level of any yard, area, or ground, or open space belonging to such premises.

(f) The lines, size, depth and inclination of the proposed drainage, and, so far as can be ascertained without opening the ground, the lines, size, depth, and inclination of the existing drainage, the surface drains (if any), and, if such proposed or existing drainage be in connection with a building, the arrangements for the ventilation of the drains —the existing pipes and drains and the proposed

pipes and drains to be distinctively indicated by different colours.

(g) The position and form of every existing or proposed manhole or access chamber, gully, junction, bend, intercepting trap, or any connection with a sewer.

(h) The points of the compass.

Provided, nevertheless, that it shall not be necessary to deposit a block plan in any case where the plans, sections and particulars deposited in accordance with the first paragraph of this by-law clearly show the particulars hereinbefore required to be shown on a block plan.

(6) The plans, sections, particulars and detailed descriptions hereinbefore mentioned shall be so deposited fifteen days at least before the work is proposed to be commenced, and, in the case where a building is to be erected, before commencing the erection of such building.

Addition to, partial construction, entire or partial reconstruction, or alteration of, a drainage system.

2. Every person who shall make any addition to, partially construct, entirely or partially reconstruct, or alter any pipes, drains, or other means of communicating with a sewer, or the traps and apparatus connected therewith, shall be deemed to have satisfied the foregoing by-law No. 1, if he shall cause a deposit to be made (in the manner therein provided) of only such plans, sections, and particulars of the proposed addition, partial construction, entire or partial reconstruction, or alteration as may be necessary for the purpose of enabling such authority to ascertain whether such addition, partial construction, entire or partial reconstruction or alteration is in accordance with the statutory provisions relative thereto, and with any by-laws made under section 202 of the Metropolis Management Act, 1855, and, if in any case plans and sections have been previously deposited in conformity with the foregoing by-law No. 1, it shall be sufficient for him to give in writing with the deposit the date of the previous deposit, and to show the new work on the plans and sections to be deposited, and only so much of the existing work as will enable the sanitary authority to see the relative positions of the new and old work.

Provided that this by-law shall not be deemed to require the deposit of any plans, sections or particulars in the case of any repair which does not involve the alteration or the entire reconstruction of any pipe, drain, or other means of communicating with sewers or the traps and apparatus connected therewith.

Alterations of drains in cases of urgency.

3. (1) In any case in which an alteration of the drains must be carried out at once, every person who is about to carry out such alteration shall, in lieu of depositing the plans, sections, and particulars referred to in these by-laws, forthwith send to the sanitary authority of the district a notice in writing of any such proposed alteration.

(2) He shall also within two weeks of the commencement of such alteration make the deposits required by these by-laws.

Penalty.

4. Every person who shall offend against any of the foregoing by-laws shall be liable for every such offence to a penalty of two pounds, and in the case of a continuing offence to a further penalty of twenty shillings for each day after written notice of the offence given in accordance with section 202 of the Metropolis Management Act 1855.

Definition of "person."

5. In these by-laws the word "person" includes any body of persons whether corporate or unincorporate.

Exemption of City.

6. These by-laws shall not extend to the City of London.

54, Bedford Square, W.C., 2nd December 1903.

To the Hon. Secretary Practice Standing
Committee R.I.B.A.

DEAR SIR,—With reference to the question of the new by-laws of the London County Council referred to you at the last meeting of the Council, I would draw special attention to the by-laws made by the London County Council, and approved by the Local Government Board on the 20th August 1903, No. 1, sections 1, 2, and 3, which describe the plans which are to be submitted for the purpose of showing the drainage system of a building.

I would ask the Committee to consider whether this is not a very onerous and unnecessary tax on either the owner, or the architect, or the contractor of a building in London. In fact, it enables a local sanitary inspector or, at all events, his chief, to require a complete set of drawings of a building—plans, sections, and, if exacted, elevations—for the mere purpose of showing the drains, water-closets, lavatories, &c. of a building. It may not matter where it is a small cottage, because the cost of such a thing is small; but where it relates to an extensive building—be it warehouse, show-rooms, block of flats, hospital, or museum—it is a very expensive matter, and, I submit, is more than is necessary for the sanitary purpose kept in view. These plans have also to be supplied in duplicate, and this means two complete sets of plans, in addition to a complete set which has to be supplied to the district surveyor.

The necessity for the deposit in certain buildings of the last-named is perfectly reasonable, because a district surveyor is an officer charged with seeing, broadly speaking, that a building is substantially constructed within the provisions of an Act of Parliament.

Many architects have taken exception to parting with a complete set of their designs even under these circumstances, but I feel sure it was never realised, when the sanitary by-laws were under consideration, that so serious an impost was to be put upon professional men.

I would further note that the expense becomes infinitely greater where a large existing building is having a new system of drainage put into it, if by-law No. 2 is interpreted by the sanitary authority to mean that "necessary" plans are all the plans required by No. 1. It would mean the measuring up of the whole of the old buildings, and preparation of complete sets of drawings, for no other purpose than this sanitary requirement.

You will also note that by-law 1, section No. 4, requires a complete specification of all sanitary and other matters.

I submit that if a block plan, as required by section 5, is given, with the levels and gradients properly marked on, this shows them everything that is necessary, as it gives them in effect the longitudinal sections. Beyond this plan a written

description of the pipes and apparatus below and above ground would be reasonable.

Yours faithfully,
EDWIN T. HALL.

The Ancient Lights Bill.

The Bill to amend the Law relating to Easement of Light was brought in by Messrs. Fletcher Moulton, K.C., H. D. Green, Herbert Robertson, Robson, and Haldane, and read a first time in the House of Commons on Tuesday, the 9th inst. The Bill, which is the outcome of the labours of a joint committee of the R.I.B.A. and the Surveyors' Institution, will be found printed in the JOURNAL R.I.B.A. for 27th June 1903.

The Prize Drawings for Exhibition in the Provinces.

The following selection from the premiated designs and drawings in the Institute Competitions for Prizes and Studentships 1903-4, together with some studies submitted by candidates for the Intermediate Examination, will be exhibited during the next few months in the districts of the Allied Societies:—

The Royal Institute Silver Medal (Measured Drawings).—Church of St. Oswald, Ashbourne, Derbyshire (3 strainers), by Mr. Laurence M. Gotch ("Dolphin"), awarded the Medal and Ten Guineas; St. James's Church, Piccadilly (2 strainers), by Mr. C. Lovett Gill ("Vis"); and Tideswell Church, Derbyshire (2 strainers), by Mr. G. S. Solomons ("Gothic"), awarded Certificate of Hon. Mention respectively.

The Soane Medallion.—Designs for a University Theatre: 3 strainers by Mr. Frederic J. Horth ("Oxon"), awarded the Medallion and £100; 2 strainers by Mr. David Smith ("Gable Endie"), awarded a Certificate of Hon. Mention.

The Owen Jones Studentship.—Drawings by Mr. W. Davidson (3 strainers), awarded the Certificate and £100; drawings by Mr. H. Morley (1 strainer), awarded Medal of Merit.

The Pugin Studentship.—Drawings by Mr. F. C. Mears (2 strainers), awarded the Medal and £40; drawings by Mr. W. S. A. Gordon (1 strainer), awarded Medal of Merit.

The Tate Prize.—Design for a Crescent in a large City: 3 strainers by Mr. Heaton Comyn ("Bridge"), awarded the Certificate and £30; 1 strainer by Mr. Arthur D. Nicholson ("Porthos"), awarded Medal of Merit.

The Grissell Gold Medal.—Design for a Timber Spire or Lantern Termination; 3 strainers by Mr. J. William Hepburn ("Cardon"), awarded the Medal and Ten Guineas; 1 strainer by Mr. Arthur Jas. Barclay ("Ich Dien"), awarded Medal of Merit.

Testimonies of Study (15 sheets).—Drawings by Messrs. T. L. Dale, J. T. Halliday, O. H. W. Hillerns, W. Stockdale, and H. C. Swindells (*Intermediate Examination*).

New Professor of Architecture at Liverpool.

The Council of the University of Liverpool have appointed Mr. C. H. Reilly, M.A. [A.] to the Roscoe Chair of Architecture left vacant by the resignation of Professor Simpson on his appointment to University College, London. Mr. Reilly, who is in his thirtieth year, was a scholar of Queen's College, Cambridge. He graduated, in 1896, in the first class of the Mechanical Sciences Tripos. After leaving Cambridge Mr. Reilly received practical training under his father and in the office of Mr. John Belcher, A.R.A. Since then he has been in practice for three years with Mr. C. Stanley Peach [F.]. In the competition for the Liverpool Cathedral his design was selected for honourable mention. For the last three years Mr. Reilly has lectured at King's College, London, on architecture and building construction, and has superintended the work in drawing and design of the day and evening students in the architectural studio. He is a member of the Board of Studies in Fine Arts in the University of London, and has taken an active part in university work.

M. Auguste Choisy [Hon. Corr. M.].

M. de Dartain [Hon. Corr. M.] contributes to the *Builders' Journal* of the 17th inst. a Biographical Note on M. Auguste Choisy, whose nomination as Royal Gold Medallist for the current year is to come up for confirmation by the General Body at the Special Meeting convened for the 29th inst. In the announcement of the nomination M. Choisy was described as Chief Engineer in the Service des Ponts et Chaussées, but he now ranks as Inspector-General in the Service, having been promoted prior to his retirement last year.

Tenants' Obligations: Some Recent Decisions.

The following cases, determinative of the obligations of tenants for short terms who covenant to pay all outgoing, are noted for reference in connection with the digest of Leading Cases given in chap. xii. of the Practice Committee's book on *Dilapidations* :—

In *Stockdale v. Ascherberg* (72 L. J. K.B. 492; L. R. (1903) 1 K.B. 879) the plaintiff agreed to let and the defendant to take a house in Kilburn for three years and then from year to year at the yearly rent of £55, payable quarterly, free of all deductions except landlord's property tax. The defendant agreed to pay all taxes, rates, assessments, and outgoing of every description for the time being payable in respect of the premises. While the defendant was in occupation under this agreement, the Willesden Urban Council served a notice under the Public Health Act upon the

plaintiff to repair the drains of the house. The plaintiff did the necessary repairs at a cost of £88, and sued the defendant for this sum. Mr. Justice Wright gave judgment for the plaintiff for the amount claimed, being of opinion that the expenses of doing the work were "outgoings" within the meaning of the agreement. The defendant appealed, but the Court of Appeal on 8th February dismissed the appeal, holding that the word "outgoings" covered such expenses.

In *In re Warriner* (72 L. J. Chanc. 701; L. R. (1903) 2 Chanc. 367), where a house was let to a tenant for three years at a "clear yearly rent of £54," the word "outgoings" did not occur in the covenant; but the Court held that the duty and expense of complying with a notice from the sanitary authority to reconstruct the drains was an "imposition" within the meaning of the covenant which fell on the tenant, notwithstanding the shortness of the tenancy.

In *Harris v. Hickman* (73 L. J. K.B. 31; L. R. (1904) 1 K.B. 13) the tenancy, which had originally been for three years, had become a tenancy from year to year at a rent of £70. The owners abated a nuisance arising from defective drainage immediately upon receipt of the intimation of its existence and before service of any notice requiring them to abate it, and it was held that, as they had done voluntarily what they were under no obligation to do, the expenditure was not an "outgoing" within the meaning of the tenant's agreement, in which the word occurred. The amount of the expenditure exceeded a year's rent of the property, and Mr. Justice Wright considered that the tenant in holding over after the expiration of his term and paying rent could not be presumed to have intended to become a yearly tenant on the terms of being obliged to abate such a nuisance.

MINUTES. VIII.

At the Eighth General Meeting (Ordinary) of the Session 1903-04, held Monday, 15th February 1904, at 8 p.m.—Present: Mr. Aston Webb, R.A., *President*, in the chair, 23 Fellows (including 11 members of the Council), 28 Associates (including 2 members of the Council), 1 Hon. Associate, and several visitors: the Minutes of the Meeting held 1st February [p. 179] were taken as read and signed as correct.

A Paper on THE BIOLOGICAL DISPOSAL OF SEWAGE FROM ISOLATED BUILDINGS having been read by Professor Frank Clowes, D.Sc., and illustrated by lantern views, the subject was discussed by Dr. Gilbert Fowler, Dr. Armstrong, F.R.S., and others: at the conclusion thereof a vote of thanks was passed by acclamation to the author of the Paper, and also to Dr. Fowler and Dr. Armstrong.

Announcements regarding the next meeting having been made by the Chairman, the proceedings closed, and the Meeting separated at 10 p.m.

SIR JOHN VANBRUGH: ARCHITECT AND DRAMATIST.

By ROBERT P. OGLESBY.

READ BEFORE THE YORK ARCHITECTURAL SOCIETY, 7TH JANUARY 1904.

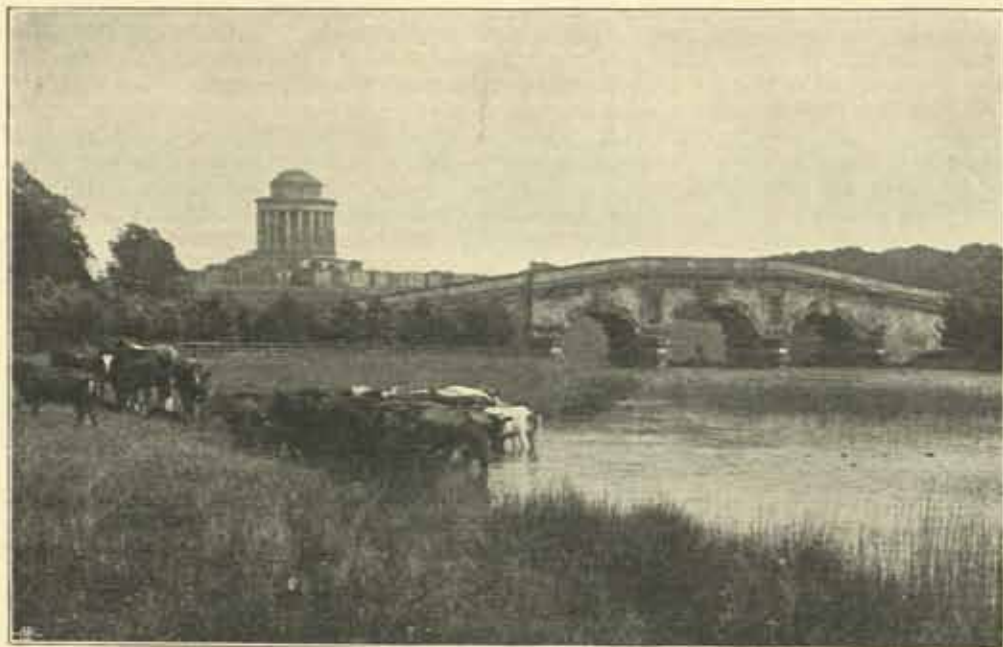


FIG. 1.—CASTLE HOWARD: BRIDGE AND MAUSOLEUM.

IN attempting to give in the short time at our disposal a *résumé* of the life and works of this remarkable man, it has seemed to me not inappropriate to consider his diverse *métiers* as distinct from one another—the period of his work as a dramatist and his excursions into architecture being to so small an extent concurrent.

With regard to Vanbrugh's origin, it seems pretty well agreed that his forebears hailed from the Low Countries. His father, settling at Chester and amassing a fortune as a sugar baker, afterwards obtained the post of Comptroller of the Treasury Chamber. The subject of our paper was sent to France, whilst in his teens, to complete a liberal education. His sojourn there must have been instrumental in equipping the young dramatist with much of the airy wit and sense of comic situation, not to say freedom of morals, which are such prominent features of his plays.

On his return to England he entered the army as an ensign. In 1695 we find him appointed

Secretary to the Commission for endowing Greenwich Hospital, and about two years afterwards his first comedy, "The Relapse," was produced at Drury Lane, obtained an instant success, and secured his reputation as a playwright.

In those days, to be possessed of wit was a sure passport to high society—and Vanbrugh's fine presence, distinguished manner, and agreeable qualities quickly established him at Court as a *persona grata*.

The comedies and adaptations which followed his first effort in no way detracted from, but rather enhanced, his fame. The poet Dryden showed his appreciation by inditing prologues and epilogues to his works. Voltaire referred to him as the gayest, as Walpole considered him the best, writer of dialogue—in fact, he is allotted a high place among dramatists of the time.

In common with his contemporaries, Vanbrugh did not escape the charge of introducing indecorous elements into his plays. A furious attack

on the comedy of manners was led by one Jeremy Collier, who issued a brochure on the subject, in which he laid down that "the business of plays is to commend virtue and discountenance vice." Vanbrugh promptly replied with a pamphlet of vindication, in which he says, "The business of comedy is to show people what they should do by representing them upon the stage doing what they should not. The stage is a glass for the world to view itself in. People ought, therefore, to see themselves as they are. If it makes their faces too fair they won't know they are dirty, and by consequence will neglect to wash them"—which was a witty if not a very strong defence.

Leigh Hunt considers that Collier laboured under the idea that the playwrights were knaves and fiends who had positively malignant intentions; and in so doing he was not aware that he betrayed a vice in his own spirit, which, if he had thought as ill of as he did of their license, would have warranted them in denouncing him as the far greater devil of the two.

However much Collier may have overdone his charges of intention, he certainly forced the writers to consider decorum. Nevertheless, Vanbrugh wrote his defence subsequently to his plays—which were no doubt merely produced for the amusement of the town—without any purpose for good or evil; and for him to profess unconsciousness of their indelicacies, and to further protest that his works might well lie alongside the Bible, can only be looked upon as an exhibition of the purest impudence.

The charge of intention is not borne out by our knowledge of his character. He had sincerity and good nature, and was happily constituted in mind and body. Subsequently both Swift and Pope openly regretted their raillery against a man of wit and honour.

As a comic writer he is always straightforward, cheerful, and robust—something between English and French, without being over nice or giving too much praise to virtue as a convention. He leans towards the virtues which are sound and healthy, and that will always remain so. His temperament was naturally opposed to hypocrisy. The license of the period must be responsible for the plainness of speech which his high spirits did not tend to repress.

Of feeling, in the sentimental sense, he possessed little. But his plots are always interesting, and free from complexity. Whatever ideas he borrows from other writers he seems to change into something better by sheer sleight of hand: an example which those amongst us who contend that there can exist no originality that is not founded on tradition, would do well to emulate.

Although one may say with Pope, "How Van wants grace, who never wanted wit," the fact remains that Vanbrugh's tradition had a large influence upon the production by Colman, Gold-

smith, and Sheridan of the best plays of the eighteenth century.

The line which divides Vanbrugh's work as a playwright and his career as an architect, is clear and decided. Nor can the slightest evidence be found of any previous architectural education, or even inclination, which would account for this transition, much more warrant him in being trusted with schemes of such magnitude as fell to his lot. We hear whispers of architects of repute having ghosts; Pecksniff certainly possessed one. But it is not probable that Vanbrugh traded upon another's talent, for he would quickly have been exposed during the building of Blenheim by the Duchess of Marlborough, whose dislike of him amounted almost to a vendetta.

There was, in a sense, a slight overlapping of vocations, inasmuch as his first completed architectural work was a theatre in the Haymarket.

This sudden leap from the Drama to Architecture was taken as a glorious joke by his brother wits and *littérateurs*, who forthwith let loose such a flood of sarcasm and raillery upon his architectural efforts as would have crushed with ridicule any ordinary individual. Swift wrote:—

Van's genius, without thought or lecture,
Is hugely turned to Architecture.

A house that Vanbrugh erected for his own occupation on the site of the ruins of old Whitehall, was dubbed by the wits the "Goose-pie;" and Swift issued the following satirical poem, indicating that Vanbrugh found the means to build from the money his plays produced:

The building, as the poet writ,
Rose in proportion to his wit—
And first a prologue built a wall
So wide as to encompass all.
The scene—a wood—produced no more
Than a few scrubby trees before,
The plot as yet lay deep; and so
A cellar next was dug below.
But this a work so hard was found,
Two acts it cost him underground.
Two other acts we may presume
Were spent in building each a room.
Thus far advanced he made a shift
To raise a roof with act the fifth;
The epilogue behind did frame
A place, not decent here to name.
Now poets from all quarters ran
To see the house of brother Van.
One asks the waterman hard by
Where may the Poet's Palace lie?
Another of the Thames enquires
If he has seen its gilded spires;
At length they in the rubbish spy
A thing resembling a goose-pie.

Vanbrugh had no sensitive nature, and being a smart, witty man he was enabled to give harder raps than he received, and continued unconcernedly to think out his colossal schemes, secure in the patronage of the Court and its belief in his ability.

Vanbrugh's first work, as before mentioned,

was a theatre in the Haymarket which occupied the site of the lately demolished "Her Majesty's," now that of the Carlton Hotel. The neighbourhood then was pasture-land, and its distance from the centres of fashion was regarded as a grave error. Moreover, the construction of the house was faulty and the acoustic properties wretched. The famous Colley Cibber, actor and dramatist, mentions that "every sound was lost in it, so as to appear like the gabbling of so many people in the lofty aisles of a cathedral." The house was afterwards altered so effectually as to render the performances audible.

who was a poet as well as an architect, there is a greater display of imagination than we shall find perhaps in any other, and this is the ground of the effect we feel in many of his works, notwithstanding the faults with which many of them are justly charged.

"I can pretend no skill in the detail of architecture: I judge now of the art merely as a painter; when I speak of Vanbrugh, I mean to speak of him in the language of our art. To speak, then, of Vanbrugh in the language of a painter, he had originality of invention, he understood light and shadow, and had great skill in composition. To



FIG. 2.—CASTLE HOWARD: SOUTH FRONT FROM THE LAKE.

This was not, one would think, a very encouraging start; nevertheless, we next hear of him, in the year 1702, being engaged upon the design and erection of Castle Howard, Yorkshire, for the Earl of Carlisle.

This was the first great scheme of this imaginative but unschooled architect. His want of training is here observable on all hands, but his genius for the picturesque atones for many defects. He seems to have regarded his buildings as so much material for scenic effect at the sacrifice of all suitability for their purpose.

Though Vanbrugh had his detractors, chief of whom was Walpole, who said that he lacked all ideas of proportion, convenience, and propriety, he had nevertheless stout adherents. No less a person than Sir Joshua Reynolds, in his Thirteenth Discourse, writes:—"In the buildings of Vanbrugh,

support his principal object, he produced his second and third groups."

The plan of Castle Howard is a blending of the Palladian and Elizabethan. It contains lengthy corridors, and hardly one fine room. The west block is not completed as originally intended, but was afterwards built (1763) by Carr of York, the architect of Harewood House. The south front is perhaps the most graceful example we have of Vanbrugh's work. He cared nought for rules, as may be seen by the varying height of pilasters belonging to the same order.

I here note a circumstance connected with this façade which seems to have escaped the attention of Vanbrugh's numerous commentators. Messrs. Belcher and Macartney, and Blomfield, in their recent works on the Renaissance in England, have escaped recording a singular fact to which I

will now draw attention. It will be observed (fig. 2) that in the east wing there are, probably through Vanbrugh's want of training, an even number of inter-pilasters, viz., eight, whereas to the west wing there are nine such spaces. My theory to account for this discrepancy is that Carr of York, in building the west block, added another space, thus correcting what he knew was an offence against classic law.

The vases, terminals, and busts which are in such profusion certainly assist in breaking up the skyline, and give at a distance a decidedly castellated effect to the building. It is doubtless the introduction of this quality which made the style at any rate popular.

The severity of the north front is much relieved by the use of sculpture. Here we see one of the segmental arcades which is absent from Carr's wing. The rapid fall of the ground in front precludes the acquisition of a photograph which would do justice to the composition. The use made of sculpture is observable in the niches between the pilasters.

The Ionic temple, with tetrastyle porticos at one end of the terrace, is again the stalking-horse for urns. The interior is lined with marble. The dome and porticos do not seem to be on very intimate terms with the main body of the temple.

Nicholas Hawksmoor, who was responsible for the mausoleum, has in this case allowed Vanbrugh's influence to pass him by, and produced a scholarly and reserved effect. Horace Walpole jocularly remarks that the mausoleum at Castle Howard would tempt one to be buried alive.

The bridge over the lower part of the lake, with its enormous keystones, is a good example of Vanbrugh's passion for ponderous masonry (fig. 1).

Passing to the interior, the hall is thirty-five feet square and no less than seventy-seven feet high to the ceiling. This height, so out of proportion to its area, gives it a dreary and tunnel-like appearance. It contains a somewhat exuberant rococo mantel.

The chapel is contained in Carr's wing, and was decorated by Kemp.

The Earl of Carlisle was so pleased with Vanbrugh's design that he created him Herald Clarencieux King at Arms. This gave great offence to his brother heralds; in the first place, because he knew naught of heraldry, and secondly because he laughed at it.

The long corridors and high rooms made the Earl anticipate a draughty house; but Vanbrugh satisfied him that on the stormiest nights "not one candle wanted to be put into a lanthorn," and that the building did not require above one pound of wax and two of tallow candles per night to light it more than the Earl's London house.

At Clarendon Building, Oxford, Vanbrugh was associated with Hawksmoor. The enormous scale of the portico would suggest that the build-

ing was designed whilst Hawksmoor had fallen under Vanbrugh's influence when assisting him in the erection of Blenheim. The site is led up to by a slight ascent, which greatly helps the dignity of the building. The proportions of the portico are fairly good, and the whole seems to have absorbed what was best in each collaborator. It groups well with the Sheldonian Theatre and Ashmolean Museum. The entablature of the portico is carried round the building, and in the pediments are semicircular windows. The skyline is broken by statues of the Muses.

Seaton Delaval was erected for Admiral Delaval in 1720. It is situated near the coast, a few miles north of Newcastle; but the site is by no means so commanding as is usual with Vanbrugh's buildings. The plan bears certain similarities to Blenheim and Castle Howard; but the central block is rectangular, with colonnades thrown out to connect it with the kitchen on the west and the stables on the east. The wings are regularly designed. The staircases are, contrary to his custom, placed in rectangular towers on either side. Viewed from the north, the large courtyard, with its colonnades, presents a grand monumental effect, and shows that Vanbrugh was not content to do things in any ordinary way; but whilst constantly striving to obtain new effects, he certainly got far on the road to great architecture.

The north front is treated with frowning severity. The channelled Doric columns upon quadrupled cushioned pedestals again indicate Vanbrugh's aversion to superimposed orders. The central portion might have suggested to Hawksmoor his subsequent treatment of the church of St. Mary Woolnoth.

The south front is rendered gracious by a fine Ionic portico. We notice here an absence of his much-loved keystones, and the details are, for Vanbrugh, quite refined. The square towers and octagonal *tourelles* at the angles give a certain baronial tinge to the building, which I might describe as a mediæval wolf ill concealed in a sheep's clothing of Palladian refinement.

Seaton Delaval, regarded as one of Vanbrugh's most successful vagaries, suffered, in 1752, from the effects of a disastrous fire which rendered it uninhabitable to this day.

King's Weston, near Bristol, finished in 1715, was chiefly remarkable for its chimneys, which are formed into a three-sided arcade. Campbell says: "The whole design sufficiently demonstrates the great genius of the architect." And, later, Gwilt remarks: "A beautiful feature in the house is the grouping of the chimneys." To my own opinion I refrain from giving expression. The great hall rises two stories, and, according to Young, is inconvenient on account of a "vast echo." Campbell remarks that "on the first floor is the lodging story, with an attic for the rest of

the family." Vanbrugh's scale was applied to all buildings, large and small; and in this example I think we see him at his worst. Nevertheless, at a distance, the building nestles nicely into its surroundings, and the arcaded chimneys become almost unobjectionable.

Flours Castle, Roxburghshire, is the only building of Vanbrugh's that we know of erected outside England. He has gone back to the earlier Renaissance for his inspiration, whilst retaining a decidedly Scottish feeling throughout. The skyline has had so much attention lavished upon it that its general effect is somewhat restless.

Kneller Hall, Hounslow, designed for Sir

appreciation of these buildings Lord Cobham erected a pyramid 60 feet high in Vanbrugh's honour.

In 1716 Vanbrugh was appointed Surveyor to Greenwich Hospital, and designed the central portion of the west side of what is known as King William's block, which is in red brick with stone dressings.

Reserved to the last is Vanbrugh's greatest work "Blenheim," erected by a grateful nation for that famous son of Bellona, John Churchill, first Duke of Marlborough, in recognition of his services to the state, and in commemoration of his glorious victories over her enemies. I may

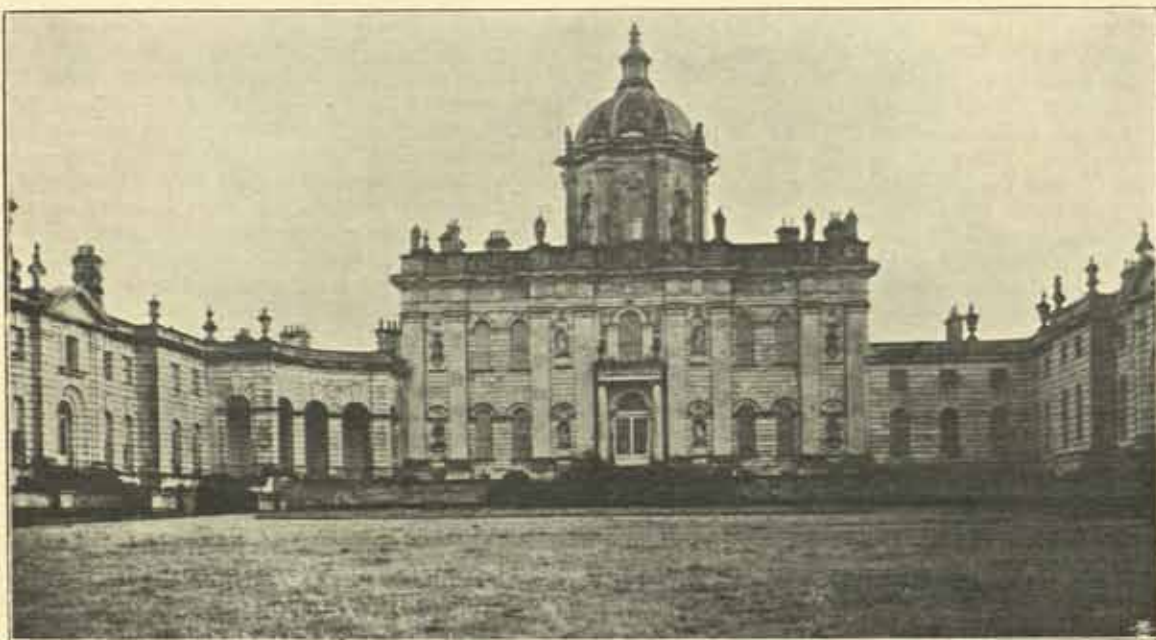


FIG. 3.—CASTLE HOWARD: NORTH FRONT.

Godfrey Kneller, the painter, is now a Royal Military School of Music. This is quite early Jacobean in feeling, and affords another rare example of superimposition, as seen by the wing blocks, which are connected on the ground floor by an open arcading with Doric columns.

Grimsthorpe, Lincolnshire, is considered by many to be Vanbrugh's best work. The hall, which occupies the whole space of the front between the angle blocks, is 110 feet in length and 40 feet in height, showing that Vanbrugh was becoming more amenable to recognised proportion. The coupled rusticated columns would seem to be an echo of Seaton Delaval.

At Stowe, Buckinghamshire, he built a large number of garden buildings. The rotunda is in a manner more chaste than usual. To show his

mention that the said grateful nation omitted to vote the necessary funds for its erection, the expense of which was really defrayed from Queen Anne's private purse.

Though Wren actually made a plan of a portion of the building, and was then at the zenith of his fame, he was passed over in favour of Vanbrugh, whose influence at Court was paramount. It is a great question whether after all Vanbrugh was not the man to infuse the requisite combination of qualities into the gift of a nation. The edifice was to be not only a palace but a memorial—residential, princely, heroic, monumental. We can conjecture how our architect would be fired at the thought of such a commission. How in imagination he would become a veritable Cyclops, wrestling with his giant grasp masses of stone,

fresh hewn from the bowels of some Brobdingnagian quarry, and so, hurling Pelion upon Ossa, create a vast upheaval of masonry which should evince his genius for grandeur, and be emblematical—when came the four corners of the world in arms—of the shock awaiting them from Marlborough's unconquered legions.

Here was his lifetime's opportunity to "stagger humanity." The plan of Blenheim at once stamps Vanbrugh as a man of powerful imagination. It bears a certain similarity to that of Castle Howard, but the quadrant-shaped wings here form façades to suites of rooms instead of being treated as open arcades. The entrance portico leads to an immense hall, which again gives on to a saloon in the centre of the south front. From these are taken corridors feeding the various apartments. The kitchen and stable wings connected by colonnades enclose a vast forecourt. Vanbrugh afterwards learnt that a number of small rooms do not necessarily conduce to good external effect. There is no lack of corridors. The word corridor was evidently new, for we find Vanbrugh explaining to the Duchess: "The word corridor, Madam, is foreign, and signifies in plain English no more than a passage."

The convenience of the inhabitants, or the fact that the distance separating the kitchen from the dining-room was several hundred feet, in no wise disturbed him. These facts in connection with Blenheim did not escape the notice of Pope, whose Muse inspired the following lines:—

See, sir, here's the grand approach,
This way for his Grace's coach.
The spacious court, the colonnade,
And mark how high the hall is made;
The chimneys are so well designed
They never smoke in any wind.
This gallery's contrived for walking,
The windows to retire and talk in;
The Council Chamber for debate,
And all the rest are rooms of state.
Thanks, sir, cried I, 'tis very fine.
But where d'ye sleep, or where d'ye dine?
I find by all you have been telling
That 'tis a house, but not a dwelling.

Strictures such as these were perhaps somewhat out of place, applied to a building which is essentially commemorative and monumental. Some idea of its size may be gained from the fact that the total extent of the park front is 850 feet.

Here, again, Vanbrugh begins his composition with a central mass, and throws out subsidiary groups of varying size and height to lead up to his main feature. Reynolds observes that "no architect took greater care that his work did not start abruptly out of the ground." Leading to the park front is a fine avenue, containing a commemorative monument, and shortly is crossed a bridge, in scale colossal even when compared with the house. It originally spanned a small canal. The massive piers here contain 33 rooms, of which the Duchess of Marlborough, in sarcastic vein,

wrote:—"That which makes it so much prettier than London Bridge is that you may sit in six rooms and look out of window into the high arch while coaches are driving over your head."

This bridge formed fair game for the wits. Pope, as usual, was to the fore with his epigram:—

The minnows, as through this vast arch they pass,
Cry, "How like whales we look!" Thanks to your Grace.

This huge bridge spanning a diminutive canal was such an evident absurdity that the lake was afterwards greatly extended by "Capability Brown," which has rendered the bridge more conformable to its surroundings, but, as Dr. Johnson wittily remarked, drowned Pope's epigram.

The park front, owing to its length, can only be realised at a distance. It thus gains in appearance by the grouping of masses and varying skyline. Although it possesses an air of solidity, there is nevertheless a lightness secured by the disposal of purely ornamental features, the whole combining to give that air of grandeur at which Vanbrugh aimed; in fact, it has been said, and I think with truth, "that no mansion has such a grand appearance as Blenheim."

In the gateway to the kitchen court Vanbrugh's fancy had full play; notice the cannon-balls on the plinth supporting the piers, a reference to military occupations. There is very little at Blenheim which does not form a site for inscriptions. Walpole observes that the Palace and approaches are so plastered over with them that altogether they form an edition of the Acts of Parliament in stone.

The south front is much more severe than Castle Howard. The wing blocks are each surmounted by an attic with pedestals supporting fantastic finials composed of cannon-balls and coronets.

The consoled cornices caused Silvester, the French artist who designed some of the interior decorations, to announce that much of the design was a weak imitation of the Palazzo Farnese at Florence. There is, at close quarters, nothing beautiful about these wing blocks; but we must not forget that Vanbrugh's building was a vast edifice intended to be viewed from a distance, and successfully fulfilled its purpose in such respect.

We hear much talk of the difficulties we present-day architects have to contend with regarding our clients; but Vanbrugh was harassed and obstructed in his gigantic work, and accomplished it under more trying circumstances than perhaps any architect has ever had to contend with.

I have mentioned that the nation omitted to vote the necessary money for the works, and that Queen Anne made all the payments up to her death. After that it was endeavoured to make the Duke of Marlborough responsible for outstanding debts on the building. The Duke had taken great care not to allow himself to be associated with the financial side of the question. Vanbrugh had repeatedly made unsuccessful attempts to surprise

him into approval of designs and alterations, but the self-possessed Marlborough was not to be drawn. It was no use trying to spring anything upon the Hero of Ramillies. Swift describes him as a man of "wonderful presence of mind, so as hardly ever to be discomposed, of a very clear head and sound judgment, detestably covetous." He certainly dribbled out a little money from time to time, protesting all the while that he had nothing to do with the matter.

In the meantime Vanbrugh himself furnished money from his private purse to quieten the workmen. Upon the Duke's death, his widow attempted to saddle the architect with the indebtedness. This was the beginning of the celebrated battle between

on this subject, a letter written by Lady Mary Wortley Montagu, as follows:—

I can't forbear entertaining you with our York lovers—love being as much forced up here as melons; and for those that don't regard worldly muck there's extraordinary good choice indeed. I believe last Monday there were two hundred pieces of women's flesh (fat and lean). In the front form is even Mr. Vanbrugh; but you know Van's taste always was odd. His inclination to ruins has given him a fancy for Mistress Yarborough.

This delicate epistle, written in her ladyship's twentieth year, gives us some idea of the state of contemporary society.

But to return. The Duchess certainly treated Vanbrugh badly; and she is the only person on

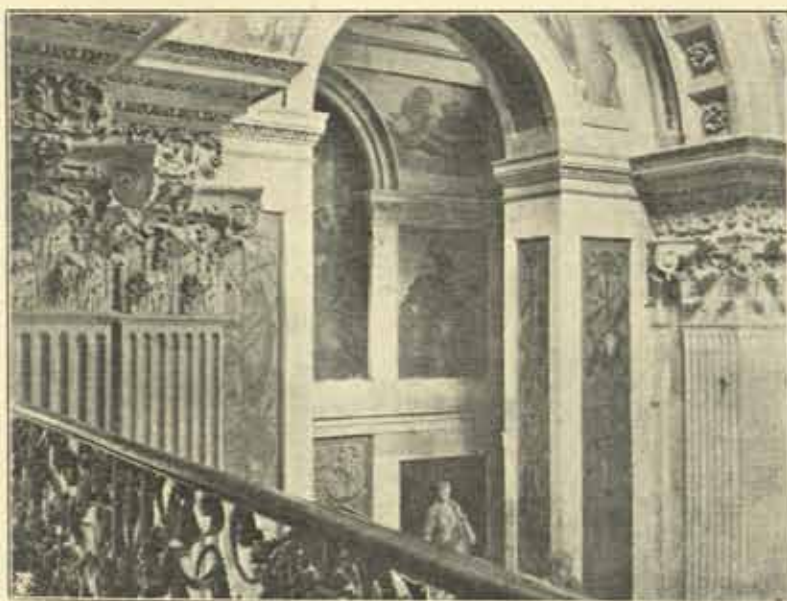


FIG. 4.—CASTLE HOWARD: UPPER PART OF HALL FROM GALLERY.

them, in which this extraordinarily able woman showed her capacity for detail. The smallest item of wages or expenditure failed to escape her notice, and every letter of Vanbrugh's was preserved and covered with spiteful endorsements.

In 1720 she brought a lawsuit, seeking to make him responsible for all debts since the Queen's death; but the bar of the House of Lords declared that Vanbrugh was not liable, and that the debts must be settled by the Duke's executors. The Duchess revenged herself on Vanbrugh by dismissing him from his post. She even refused him a sight of the completed building when he arrived from Castle Howard with his wife.

Vanbrugh married rather late in life. He writes: "If I am going to make a blunder it is better to do so at the end of one's life than at the beginning of it." His wife was a daughter of Colonel Yarborough, of Heslington, near York. I quote,

record against whom he nursed any resentment. He alludes to her as "that wicked woman of Marlborough"; and again, in a letter: "The Duke has given his widow—(may a Scottish Ensign get her)—£10,000 a year to spoil Blenheim her own way, and £12,000 to keep herself clean and go to law." And, still again: "I have been forced into Chancery by that B.B.B. the Duchess of Marlboro'; but I got my money in spite of the hussy's teeth." Leigh Hunt observes that the meaning of this formidable line of B's may be guessed at from parallel remarks by Shakespeare on "heaths."

On Vanbrugh's own authority he received £400 per annum for his work here, but he looked upon this as an honorarium. Hawksmoor was employed for some time as clerk of works, and grumbled that he had only received half that salary whilst doing the greater part of the work.

That we might do well to emulate Vanbrugh's

care in his estimates is illustrated by a letter to Sir Robert Walpole regarding a projected Garden House, in which he says:—

I have made an estimate of your fabrick, which comes to £270; but I have allowed for doing some things in it in a better manner than perhaps you will think necessary—so I believe it may be done for £200.

But for your further satisfaction I desire that you will send your clerk of works to me, and I will explain it so to him that he may likewise make a calculation without showing him mine or telling him what I make the expense amount to in the total, and when this is done, we will give each particular article to the respective workmen, and they shall make their estimation too, so that you shall know the bottom of it at last, or the Devil shall be in it.

The eastern façade, with its Italian Garden, has the angle towers as its main features. The centre bay is one of the few examples of superimposition by this architect, where we have a comparatively small Doric order surmounted by Persians.

The west front is similar in design, except that the semicircular bay is carried up two stories, which seems to emphasise its want of scale with the remainder. Vanbrugh here suggested the addition of a greenhouse, which should be a most pleasant sitting-room, "for that indeed," he says, "is what I take it to be, and not a magazine for a parcel of foolish plants." The Duchess was furious at the thought of this expenditure, and endorses the letter: "This greenhouse, I thank God, I prevented being built; nothing can be more mad than the proposal."

To pass to the interior—the hall is approached from the north portico, and possesses little grace or refinement; the engaged Corinthian columns in the angles appear particularly lonely. A view looking south is more pleasing; though here, again, we have varying heights of the same order. The hall is 55 feet by 45 feet, and 67 feet high. From the hall we pass to the saloon in the centre of the south frontage, with its marble door dressings and wall paintings. This acts as an inner hall, to serve the apartments on either side. Here is one of the state apartments, containing tapestries illustrative of Marlborough's victories. A number of these rooms have been recently refitted and decorated.

The library, which measures 183 feet in length, extends along the whole of the west front. It is

broken up by bays, and was meant to take the place of the long galleries which are such prominent features in the earlier mansions. It is panelled in oak painted white. The columns and pilasters are of marble.

The chapel is reached from this apartment along an open colonnade. It is chiefly remarkable for the great monument to the Duke.

The actual workmanship of Blenheim is admitted to have been admirable. One writer remarks "that so perfectly was the work carried out that it is possible to look through the keyholes of ten doors and see daylight at the end, over three hundred feet away" (!).

In conclusion, however great were Vanbrugh's faults, and notwithstanding his glaring want of refinement and taste, he possessed valuable qualities for his profession; and had he lived longer would no doubt, by further study, have become a really great architect. He certainly conceived of his buildings as a whole and in relation to their surroundings, as Payne Knight observes: "The views from the principal fronts of Castle Howard and Blenheim are bad, and much inferior to what other parts of the grounds would have afforded, but the situation of both as objects to the surrounding scenery are the best that could have been chosen."

The ponderous extravagancies of Vanbrugh, however blamable in detail, are never contemptible in the whole; and amidst all the unmeaning absurdities which the learned observer may discover in the parts of Blenheim and Castle Howard, the general mass in each has been generally acknowledged to be grand and imposing.

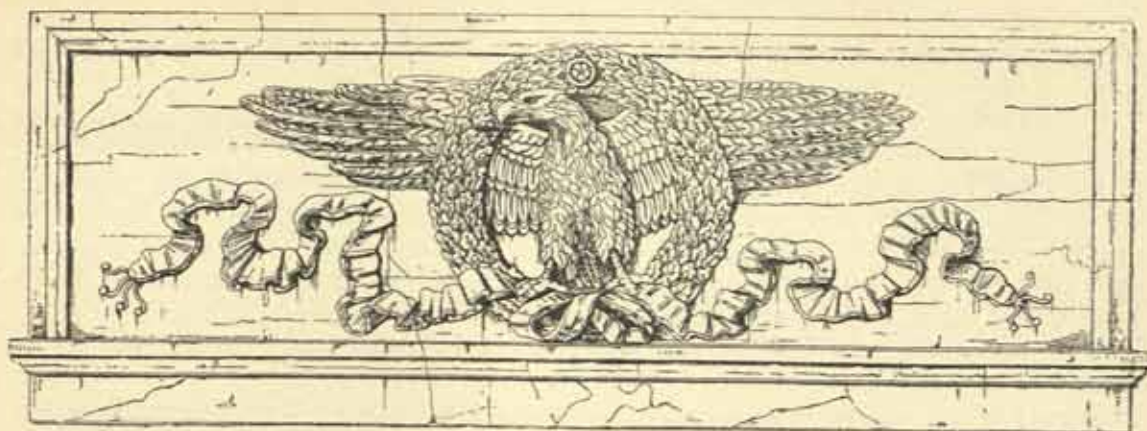
Berry, Walpole's editor, quaintly remarks:—

Large edifices might be erected from the unnecessary excrescences of stone that load his buildings; and however admirable Vanbrugh's structures may be in their present state of perfection, I will venture to guess that their ruins will have far greater effect, not only from their massive fragments, but from the additional piles which conjecture will supply, in order to give a meaning to the whole.

Even after Vanbrugh's death the wits still had their fling at him, and his love for the ponderous in architecture is handed down to posterity by Dr. Evans's witty and not inappropriate epitaph:

Lie heavy on him, earth! for he
Laid many heavy loads on thee.





THE REGISTRATION OF ARCHITECTS.

By Professor BERESFORD PITE [*F.*]

Paper read before the Glasgow Architectural Association on 13th January 1904; before the Manchester Society of Architects on 14th January; before the Bristol Society of Architects on 1st February, and before the Leeds and Yorkshire Society of Architects on 11th February.

PROPOSALS for the Registration of Architects by statutory enactment have been placed before the profession and embodied in a Bill introduced into the House of Commons in the Session of 1903. The Bill was dropped, and is not therefore now actually in existence, neither was it the first that has shared this fate; but as the subject of the registration of practitioners in architecture cannot be usefully considered apart from the means proposed for effecting it, I propose to regard the Bill of last Session as indicating the best obtainable working programme which the earnest thought of its promoters can offer to the profession.

Though this Bill is repudiated by some supporters of the principle of registration upon the ground that it was not promoted by the Institute, it must, I think, be admitted that any scheme for closing up the profession of architecture by legal compulsion must proceed generally upon some such lines as are therein laid out. The subject must assume, after all, a purely practical aspect, and until some other practicable scheme is propounded the most useful consideration will be that which is devoted to actual proposals for giving legal effect to registration.

SUMMARY OF THE BILL OF 1903.

The preamble of the Bill thus concisely states the object proposed to be attained: "It is expedient that persons requiring professional aid in architecture should be enabled to distinguish qualified from unqualified practitioners," leaving it to the subsequent provisions to indicate that the method of distinguishing between the two classes is by attaching to the word "architect" a new and legal, rather than its traditional and natural meaning.

The formation of a paid General Council of Architectural Education and Registration is provided for—which I do not stay now to criticise—and the appointment of Registrars, who will keep the lists in England, Scotland, and Ireland, receive the fees, which are fixed at £5 for registration individually, £3 per person if on a society's list at the start, an annual fee of £1, and apprenticeship fees of £5, £2, and 10s., varying with circumstances. It is the duty of the registrars to remove from the list of authorised architects the name of anyone who does

not pay these taxes. Further undefined fees may be charged for entering on the register initials of distinction, *e.g.*, A.R.I.B.A., F.S.A., &c.

The General Council is to register Fellows and Associates of the Institute and its allied societies, and members of the Society of Architects, at the passing of the Bill upon payment of fees; and any person who can prove to the Council that he was actually practising architecture—of which pair of vital terms no definition is attempted—before 1895; also anyone who has been an apprentice, assistant, or practitioner for a period of twelve years after the person was fifteen years of age, and presumably including ladies. It is not required that the applicant should have confined himself to the professional practice of architecture. No question therefore of qualification arises at present, and the promise of the preamble does not cover the effect of this provision.

It may be observed, not as an instance of careless drafting, which it is not, but as illustrating the fundamental difficulties of the scheme, that no stipulation for good character is required in the initial form of application for registration of home practitioners, but that it is expressed that Colonial practitioners should satisfy the Council of their good character before being entitled to be entered on the list.

After the passing of the Act an apprenticeship of three years, or two years' apprenticeship with five years' service as assistant, or an assistantship of ten years with a registered practitioner, will be enforced, and the age of twenty-one attained before the qualifying examination for registration can be applied for.

The qualifying examination is to be a single one, held by the R.I.B.A., or by some other body appointed on the representation of the General Council of Education to the Privy Council that the qualifying examination or the examiners are unsatisfactory—inspectors being appointed to attend examinations with this purpose in view.

The standard of examination is defined as "the possession of the knowledge and skill requisite for the efficient practice of architecture," a phrase not open to criticism other than that it would be indefinite legally.

The General Council are to remove from the list the name of any person convicted of a misdemeanour or higher offence, or where shown "after his registration" to have been guilty of any conduct infamous in a professional respect. The scope of this important term is not defined in the Bill.

Generally these provisions cover the process of registration; but before coming to the sanctions by which it is to be enforced upon architects, we notice the exceptions to their operation. The rights of professional members of the Institution of Civil Engineers and of the Surveyors' Institution are not to be prejudiced for "work of any kind falling within the duties of their calling." Further, if producing certificates of competency from the councils of their own bodies, they may, as officers of any city, borough, or similar authority, prepare or pass plans of buildings: thus embodying the admitted disadvantage under which the profession of architecture suffers from at present in the employment of those who are not architects, to execute public and municipal work. The inroads of the large furnishing and building firms, trading as limited liability companies, upon the professional sphere of architects will apparently not be affected by the Bill, and the important and highly probable cases of a firm or company, one member only of which has the legal qualification, and of a business carried on in the name of a registered practitioner by unregistered persons, do not appear to have been contemplated.

Implied exceptions are all persons who practise architecture without taking or using the name or title of architect, either alone or in combination; and it is supposable, therefore, that the use of the initials indicating professional membership of an Architects' Institute or

Society, as descriptive of a calling by an unregistered architect, would not be affected by the Bill. The exact words "unregistered architect" as a title of distinction will of course remain as a prospective ideal for a free architectural student. The criticism may be offered whether the exception of engineers and surveyors who build, and the impossibility of excluding the use of terms which might define membership of architectural bodies or of non-registration as a distinction, will not result in preventing the attainment of that exclusiveness and of that closing of the profession which it is the object of the Bill to effect; and further, whether the creation of a registered core in the profession which at the outset and for a generation must include and be tainted by all the black sheep and illicit commission-takers who may and certainly will claim registration, will not render it pleasanter to remain in the free air of an unlimited educational and professional ideal, *Æsop's* moral to the fable of the fox who lost his tail not having been yet forgotten.

The coercive force in the Bill is necessarily provided in the enactment that no one but a registered person can recover charges in courts of law for professional services as an architect, and by penalties of £20, and £50 on repetition, for the use of any such name or title or description as architect registered under the Bill, the fines being inflicted by a court of summary jurisdiction.

These coercive provisions furnish the operative power of the measure, and are necessary if the compulsion proposed is to be at all effective. The profession should therefore carefully consider their effect, and forecast the operation of the process of registration.

REGISTRATION INVOLVES TESTING OF QUALIFICATION.

We now pass from the *modus operandi* to consider the thesis of the preamble of the Bill that registration is to be made of qualification. Qualification which is to be tested by examination. Examination which presupposes an education upon which it proceeds. The education generally indicated in the Bill is that of a three years' apprenticeship with a registered practitioner, and it might therefore be presumed that the education necessary for qualification could be generally acquired in this short time.

The Bill defines neither the term *qualified* nor the matter of examination. The whole subject of education and examination, with the exception of the attempt to impose a legal compulsion upon apprenticeship, is shirked by reference to the new General Council of Architectural Education, which apparently delegates the matter to the R.I.B.A. and colleges, though education is not part of the work undertaken by the R.I.B.A. And as the Institute has found it necessary to abstain carefully from describing its existing examinations as tests of qualification for practice, and relates them to candidature for its Associateship only, I wish therefore to consider the general question of testing the qualification in architecture by examination, as it is on this basis, broadly speaking, that registration is founded.

It should be a fundamental consideration that examination presupposes a scheme of education which, as a whole, does not now exist, and examiners who are qualified to examine by the conduct of education, if we really are to admit a proposal which will settle and fix qualification by examination, and therefore education by and for examination.

WHAT IS AN ARCHITECT?

What are the qualifications necessary and peculiar to an architect? In other words, what is an architect—what is his mystery and profession?

It would not be satisfactory, in connection with this controversy, out of any special

regard to an ideal view of the architect as the master-builder or craftsman, to avoid the terms of expression ordinarily employed; so I describe an architect as a worker of two-fold characteristics. He is first, a man of science qualified by practical experience to prescribe the materials and workmanship of a building; and he is, second, an artist qualified by skill in invention and arrangement to design beautifully, and to impart to building construction the qualities that attract intellectual appreciation and which attain to architectural beauty; and the relation and co-operation of these two characteristics is of fundamental importance to our definition.

The first of these qualifications, that which embraces constructive science, is essential to the second, as the second, that of ability to design, is to the first, if the architect is at all to be differentiated from builders or from engineers who exercise merely scientific construction as their calling.

It is the scientific knowledge and the practice of construction which make the artist an architect; without this he is but a draughtsman, perhaps impracticable, at all events not charged with the practicability of his designs; and may be a visionary, creating artistic dreams in pencil on paper without the power to effect them scientifically in that permanent construction which is architecture. Similarly, the power of expressing thought in form by utilising dimension, proportion, line, mass, light and shade, and ornament and colour, as graphic means for the communication of intellectual ideas, is essential to the scientific constructor who would claim inclusion in the term architect. Architectural expression thus speaks, without words, thoughts of serviceable or joyous, and it may be in monumental work, of lofty and transcendent character, for without this power the architect has no quality which differentiates his practice from that which it is necessary to describe as mere building, though without invidiousness, as the term builder is highly honourable and descriptive of great and noble work.

I cannot admit, and the world at large to which the professions of "practitioners" are addressed, and by which they will be judged, will not admit, any other meaning to the term architect than that it defines one whose profession it is to combine with the practical science the intellectual expression of art, however much that world may be in ignorance or error as to the quality and character of the art so professed and provided. Further, it is not surely necessary to labour the thought to architects, that they exist essentially as servants of art, and occupy a position which has always and even now affords a pontificate in aesthetics, and which cannot be disowned or laid aside without sacrificing the higher and most vital portion of their profession.

ARCHITECTURE A UNITY OF SCIENCE AND ART.

Architecture in its dependence upon science for the expression of its art creates a union of practical imaginative ideas; it thus combines two modes of thought often supposed to be antagonistic, and procures a harmony between the real and ideal which is of the highest value to current thought and life. The expression, in so concrete a manner and matter as in a building, of such abstract ideas as those expressed by a dome or in the mystery of lofty vaultings involves both a high attainment in scientific construction and imaginative design. From the higher examples the same union of science and art descends through buildings for monumental, religious, and civic purposes to those of home and business service, and is the poetry which can make the humble things of life sublime. It unites in harmony unrelated forms, as music and poetry make rhythm of sounds, and combines, in the exercise of a consistent construction, beauty with truth and art with science in architectural thought.

Is not this view of the office and service of our art a real and practical one? And, if it

is neglected or forgotten, may not the architect fade into a mere ghost, and substantially exist only as an operator in skeleton construction, ungraced and unsanctified by art?

The value of the witness of architecture to a true unity between science and art should be of especial value in a generation so stiff-necked and Philistine in its attitude to art as our own, though too ready to glory in engineering triumphs ingloriously decorated with bad architecture. That Architecture exists only in a just union of science and art is her salvation from Philistinism and her justification; each element is reliant on the other, and so fulfils herself in a work of building that the art is essential, not superfluous.

Architecture is this unity of science and art; without the art the science is that of building construction equally practised by all who build, and is not peculiarly architecture at all; and without the science the art is either mere draughtsmanship or an antiquarian dilettantism. The architect, then, is one who unites the builder's science with the designer's art, and who is neither one nor the other, but unites both functions in one.

The profession should be seized with a fair view of its own calling. Not unfair in a one-sided and undue devotion to what are painfully called art notions, by which the term artistic might acquire a false and contemptuous use, or, on the other hand, in supposing the application of ornament to unconsidered and naked building to be architecture, perhaps idly excusing expenditure of thought as involving that of money.

The architect is called to elevate with ordered thought for the beautiful the buildings of his generation, and definitely to make them expressive of culture in building art. We qualify fully by saying that in achieving this properly the skill and experience of affairs common to all business transactions in civilised communities and a scientific knowledge of construction equal at least to that of the builder or building-law-policeman are requisite, for without them our art may never find satisfactory opportunity of expressing itself in good building. But our peculiar office as architects, and necessarily its peculiar qualification, is that of building artists or artistic builders. The art of building beautifully is architecture, the man who builds beautifully, and no other, being an architect.

THE TESTING OF THIS DUAL QUALITY.

The consideration presents itself, now that we presume the architect to exercise a science artistically, and an art scientifically, how are his qualifications for the practice of this art of architecture to be distinguished or known? To this there is but one ultimate and short answer, namely, by his works, and by them alone.

But this means of judging will probably be denied us as part of the circumstances of the case, the problem proposed being to determine an architect's qualification to do without doing, to test by theory rather than by practice, to approve the practice in advance of the preaching instead of the proverbially wise one of testing the preaching by the practice. We are set the task of determining the architect's artistic qualification theoretically by testing his education by examination.

We define at the outset here the unsatisfactory feature in registration, that it assumes a practical qualification by a merely theoretical education test—testing such an education by literary examination methods. It may be alleged that nothing else can be devised, that in the absence of a better method we must be content with this; but we are bound to object that no attempt should be made under such an admission to impose compulsorily an unsatisfactory and defective test upon architects. It should first be shown that the test proposed and provided is so generally effective that its operation will meet the demand made of qualification upon it, as to place it in admitted authority and usefulness, before it is suggested to apply it

compulsorily, like vaccination or elementary education, to the subject; for the matter leaves the open ground of general agreement as to the desirability of education in many and various subjects, general and particular, when it is proposed to prohibit the practical exercise of architectural science and art unless with a legal qualification by theoretical examination questions.

It is not for me to suggest at present any other test—there is much to be said on the subject of improved systems of education at the proper time—but the testing of qualification to practise architecture by examination lies at the heart of the Bill for the registration of architects, and any failure possible in such a test is reason for refusing to make it obligatory and its evasion penal.

Leaving now the objections that lie against theoretical examination in architecture for practical work, we must inquire by what method and to what standard would a legal examination exercise in architecture be conducted by a tribunal? The only reply that seems possible is that it must become necessary to separate the art from the science, dissolving out the architecture which exists in the combination of both, and to substitute for it an analysis of separate elements, a programme which in my view will have a most unfortunate effect upon sound architectural education.

THE SCOPE OF SCIENTIFIC EXAMINATION.

The scientific part which is common to all building work is founded upon classified experiment, and is acquirable by study, and for the greater part capable of test by written oral and graphic methods of examination. This part need not be catalogued here in detail. The practice of each of the building trades, though bred in traditions of handicraftsmanship, has—to its loss—been necessarily crystallised in text-books, and we are quite familiar with examinations in “building construction.” A knowledge of pseudo-bricklaying, by the names and shapes of its tools and methods, and of the materials it employs, can be acquired by a literary method, which would be of little avail to a practical building craftsman, though distinctly interesting to such a professional onlooker as an architectural student, as experiment alone can practically educate a student in brick-making, or in the action of limes and cements in mortar and concrete.

Is this literary knowledge a qualification in any effective sense? Should we not be resting on a shadowy sufficiency were a legal qualification acquired by a rapid, almost momentary, examination in answering the two or three questions that a general architectural examination would be able to devote to so important and serious a subject as bricklaying and walling?

And what of “foundations”? Experience, long and varied, many careful notes, and much visiting of works we should desiderate before “qualification.” With what differing loads, on what differing soils, have we all to deal with nervous care and anxious consideration in practical business life! And yet such “qualification” may be rapidly secured if a short paper of a few more or less hypothetical questions is almost magically answered in the intended sense.

What is true of such subjects as brickwork and foundations is true more or less of all the building trades—of carpentry and joinery in their many departments and uses, of floors, of roofs, of stairs, of doors and windows; there is a certain theoretical knowledge derivable from books, interesting though unpractical as a qualification for the exercise of each trade, which can be made the subject of an examination paper; but when acquired, has left out—as it has not ventured to touch—the whole architectural aspect of each craft in that essential union of the art of design with the science of construction. It is equally useful and available for all builders, and has nothing peculiar or special to the art and practice of architecture.

In constructional ironwork we have a branch at present governed more by what would

be called scientific considerations than the others—in this subject simple mathematics are necessary for simple examples; but with complicated construction and strains building construction soon passes into engineering, and it would become difficult to fix a defining line of qualification. It is quite time that this branch of theoretical study was treated definitely and courageously, as one for a thorough artistic consideration, owing to its growing architectural importance. Iron and steel construction are most characteristic of our age, and indicate the direction of rapid progress in the near future; but how can one at present imagine an examination of qualification for the practice of architectural art in iron construction?

Examination in architectural qualification may utterly fail here in one of the most important and in the most progressive departments of building art, though in the mathematical and graphic demonstrations we are on common ground with the engineer, whose qualification it is not proposed to test by legal examination and registration.

The sanitary fitting and drainage of buildings similarly are scientific in principle and of great importance to the community at large. The mechanism of ordinary systems of the water carriage of soil, and the risks and dangers consequent upon defective workmanship or design, demand the fullest attention. The subject already commands a large literature, and perhaps more than any other directly connected with building has improved in nature and character under the newer influences of the science of disease prevention. A literary study, accompanied by some workshop demonstrations, of plumbing is at the disposal of all students of public health and of public and private building, and certificates of examination are already issued by various bodies to those practically engaged in sanitary work and to inspectors. The architect among these takes his place simply and obediently as a sanitary constructor; it is indeed a primary requisite that he should be equipped with knowledge, and this he seeks and obtains as necessarily as how to construct without danger to life and limb from mechanical failures in his buildings. It is a common requirement of the community, and he cannot plead exception to its obligation or peculiarity in its possession.

We may here again ask the question: Why should the State in the interests of the community put architects alone of builders under compulsory examination and registration in sanitation? The executant rather than the agent should be the subject first of registration, and no voices other than those of lovers of general liberty will be raised against any well-considered sanitary efficiency legislation, though I am under the impression that the public have at present nearly all the protection needed under a reasonable administration of the Public Health and Local Government Acts.

Each other trade or craft has a literature dealing with its science of ascertained facts and laws, and for this purpose only of testing the student's acquaintance with these facts is examination in any way effective. Such examination has definite limitations, it cannot be thorough owing to want of scope or practical owing to want of experiment, and it may be entirely unsuited to the genius of the student subject to it; but, such as it is, we admit its place as defining studies of a literary or graphic nature suitable to review, and testing by questions and definitions.

In all it deals solely with the science of building construction, with what can be imparted by systems of class teaching or literary education, and in which the text-book or problem supplies definite answers to examination questions—that is, a satisfactory and fair basis for the question of the examiner, and the answer of the student. The need for this definiteness of appeal is absolute, as examination will be obligatory and failure penal, and the candidate must be provided with a remedy against error or unfairness on the examiners' part.

It is only because I am conscious of the extent of study and of practical scientific training open to, necessary to, and involved in each department of the science of building that I emphasise

the uncertainty and the insufficiency of such examinations if regarded as qualifying for the practice of building art; they may be stepping-stones in a portion of a student's career, but before authority could take upon itself to pronounce "qualified to practise" upon such tests the ultimate standard of professional attainment will have to be lowered seriously.

Will not the pedantic satisfaction of having schemed and planned a technical examination which affects finality replace the higher, more practical, and useful ideal of opening out to students the many roads to be pursued by observation and practice, for a complete knowledge as the goal which we may be content to regard as the object of the Institute examinations?

BUSINESS EXAMINATION.

To the more strictly scientific subject of building construction may be added, as matter for examination of a more problematical character, the subjects which are usually included in the term surveying, and which do not imply the use of any art other than that of intelligence in the conduct of business operations, contracting forms, estimating, certifying value received, proper definition of land and materials by measurement, and possibly also as to conflicts upon easements of light and support, and other points related to the law and usage of houses, buildings, and estates.

Qualification in these branches to guide the public is very widely dispersed; it is shared by many who are not architects. All these subjects are integral to some forms of agency for land, estates and houses, for surveyors and auctioneers, while incidental only to architects in the pursuit of their art; in all these matters it must be open to an architect to employ and rely on the assistance of those specially expert in the needed branch, and in actual practice it is necessarily the case that this results.

The knowledge precedent to experience in the conduct of such business may be imparted by tables and documents, and to that extent tested by examination; but this would compare only with a junior and preliminary step in such a series as already exists at the Surveyors' Institution.

It will be noted that each of these subjects, the study of which can be conducted by methods capable of being tested by examination, is scientific or concerned with business economics. So far as they concern public health and safety, qualification in them may be considered a matter for legislation by a paternal Government, which has already largely regulated building operations by statute; but it will also be observed that these subjects affect other practitioners of building to a much greater extent than architects. We have dealt as yet with nothing affecting architects as a class which does not affect all others engaged in building, therefore no legislation for the public benefit in these matters will be effective or just which lays only a few under legal qualification in the conduct of building. A registration examination in constructive science will leave builders, surveyors, and engineers free as heretofore to enjoy the liberty of practising building, and deny it to architects under the title which truly defines their art and handicraft.

EXAMINATION IN ARTISTIC QUALIFICATION.

The architect, however, practises an art combined with science, but as artist he is architect, and cannot practise architecture apart from art. The confusion, if not ignorance, of thought upon this matter which has led to much earnest advocacy of registration, would have been directed to ends more advantageous to architecture if the profession had given more consideration to the nature of the art which gives a title to regard.

We must now devote some attention to the simple questions, so difficult to answer, what is the artistic qualification necessary to an architect? Secondly, how can this be tested for the purpose of registration? And thirdly, how the public would be damnified by the failure of an architect to pass the artistic qualification proposed if he were allowed to practise? And, in view of a possible answer, we must then inquire whether it would not be better to delete the architectural test from this compulsory Bill and leave to it a measure for partially testing constructive knowledge applicable to all who are responsible for building works.

1. What, then, are the qualifications in architectural art requisite to an architect—those which the public have a right to demand?

A strange question this, indeed; one that certainly should be asked seriously by all of us, and one that if not asked and answered may find us some day convicted of insincerity where sincerity is essential, and of pretence and ignorance when truth and knowledge should express the sum of our life's ambition and labours.

A protagonist of the Registration Bill has recently said that it is for the young men that this battle is being fought. I fear that this speaker has had no experience of the emulation and quickening of high ideals in the exercise of a creative art, or of the poetic delight which the contemplation of wonderful designs, and of the fellowship of craftsmanship with their creators, stirs in the breast of an architectural student.

To the young architect the answer to any question as to the artistic qualification requisite for his practice cannot be definite; he will presume an ideal of qualification which is a humble and distant but faithful discipleship of some great master or school of architecture, and urge that he must embark on a path of progress in such discipleship to which he sees no goal short of his master's ideal and standard.

2. I would ask, secondly: is this qualification measurable by examination, measurable in marks? And if it is indefinable, visionary and unmarkable, is registration to be denied for failure to satisfy the "General Council"?

We may lay emphasis on the point that a Registration Bill will fail to prove its preamble if "persons requiring professional aid in architecture" cannot by registration "distinguish qualified from unqualified practitioners."

The distinction between a real architect and an unreal one, to put it mildly, is to be sought, defined, and sanctioned by registration; so we must ask what are the qualifications in the Art of Architecture that the public demand apart from architects' ideals? The question seems to be pertinent, and we could answer it ourselves were we not individuals with notions on architecture, good and bad, and on architects qualified and unqualified. The late Mr. G. E. Street, of whose repugnance to submit to an architectural examination, conducted in the heat of the battle of the styles by a board of classical professors, some of us can judge, when lecturing at the Royal Academy, during the term of my studentship, cited, without disapproval, a mediæval instance of royal displeasure with a design being followed by the decapitation of the architect. The notions of other persons in authority as to the public demand for quality in architectural design, even in these days, seem to be as emphatic and perhaps as unreasonable. The criticism in Parliament by so responsible and eminent a statesman as Sir William Harcourt of Mr. Norman Shaw's New Scotland Yard building is to the point, and indicates that the difficulty of attempting to define a public standard of artistic qualification is as serious as it is to measure a student's ideal.

But this question is raised and must be settled by a Registration Bill; for an architect registered under its provisions will be distinguished by it from an unqualified artist, and some standard for this architectural test must of necessity be imagined. This standard has not yet been created, and until it is revealed and embodied in some new order or orders of archi-

ture, registered by diagrams in a schedule, and approved by the Privy Council, the short and simple preamble of the Registration Bill is incapable of logical defence and impossible of practical interpretation.

I should like to venture answers to the two questions under discussion, such answers as may be possible, lest this criticism of the endeavour to assert a fixed qualification in architecture should be merely negative or captious.

I would suggest, in reply to the question, What are the artistic qualifications necessary to the architect and reasonably demanded of him by the public? that the true architect has the ability, partly intuitive and partly attained by cultivation, of building beautifully, ordering the aspect of the whole and details to express the satisfactory fulfilment both of purpose and pleasure in the building. The qualification of the architect lies in his power to do this, for the man who cannot build beautifully is either not an architect at all, or a bad architect, and we are not asked to register one or the other.

To the second question, How is this architectural qualification to be tested by authority? I would reply, There are standards, more or less accepted, which define works of architecture ultimately as good or bad; for there are now, and have been in the past, bywords among buildings. Dislike and contempt have been poured upon works of art which could not have been expressed without some standard of qualification in the public or private mind of the "examiner" for the time being. These expressions of qualification have been neither the products of ignorant uncultivation nor the unauthoritative criticisms of those "men in the street" to whom external architecture so widely appeals. Councils of artists and architects, and authorities of State and Church, have severally, under varying circumstances, tested by canons of taste and condemned works of architecture, in no hesitation as to the complete justification of their test, or as to the impossibility of admitting such monstrosities to be examples of that "efficient practice of architecture" now proposed to be registered. But are we not all convicted by experience of the swift revolutions of taste and history, that all such judgments are open to appeal, new trial, reversal, and quashing? There is a supreme court of appeal in architecture, but so slow in its procedure that it reckes nothing of waiting an era, public opinion raging as it will meanwhile, before allowing the appeal. The despised of one generation often becomes the ideal of another. The answer to the question being that the test of all efficient building art is an allowed survival of the fittest.

Architectural qualification, I believe sincerely, is a matter of heart, not of art as usually understood. It is in the architect's purpose and earnestness to train his thought truly, and to express it without fear of himself or others in his building, that the test of his qualification lies; and where or what is the authority that will presume to examine, register, or deny, qualification to a candidate in sincerity and freedom of motive and expression? For in these lie the art of architecture. An artist's spirit must be free, and without liberty art will die, and a limited registered professionalism of partially scientific and business capacity take its place, for qualified architects cannot be distinguished from unqualified by legal process.

The promoters of registration, in their zeal for the status of the business and professional man practising as an architect, overlook the greater question, which should outreach personal and professional politics, that of the interest of architecture as a fine art, freely expressing national thought and life. We shall certainly be judged in the world and history by our architecture rather than by our legal qualifications, and our professions will be justified or condemned by the art through which we strive as part of the body politic to express the age and genius of our race.

We are not at present ashamed of our position as a nation among the families of the

world. The freedom of development in ecclesiastical and domestic architecture in these lands has secured us a place of honour among nations whose civil and monumental art is still beyond our attainment; but I do not find those who are the leaders, in every architectural sense, of the profession of architecture among the promoters and supporters of registration. The men whose feeling and practice, whose works and achievements, guide us and point the way to further attainment in the art, shun the proposal to define by statutory enactment that which they know and feel to be incapable of such unsympathetic handling. The registration movement indeed lacks sympathy both with architecture and architects in seeking to establish a legal test of an indefinite architectural qualification.

THE INEFFECTIVENESS OF REGISTRATION.

But the attainment of some test in architecture, difficult as it is, we will suppose to have become operative as a means of distinction between qualified and unqualified practitioners.

I wish, therefore, to inquire, thirdly, how or why the public interest would suffer if a would-be architect, having passed the tests in the partially scientific and business portions of the examination, but failed in or evaded the artistic tests, were allowed to call himself an architect and practise as such? I cannot think this possibly to be a matter of any materiality at all. That all who build should build safely and healthily is of serious importance, and is provided for by the Legislature; but that such buildings should be artistic is another matter, and belongs to the sphere of sentiment. It is desirable—it would be delightful if feasible; but no registration will secure it. The Registration Bill, in fact, has to exclude from its own operation the greater mass of the buildings of the country executed by builders, municipal and civil engineers, including that increasing class where no recognised architect is employed of great building speculations in our great cities. The Bill does not pretend that it is necessary in the public interest that these buildings should be artistic; would it not therefore be well, at once necessary, more generous, and safer in its interests to remove architectural art from its scope, and to eliminate it expressly from its examinations and tests as an element of a gratuitous character, welcome and desirable where present, but not capable of enforcement with penalties as part of the architect's qualification? Mr. Ellis Marsland, the active secretary of the promoters, almost concedes as much in defining the art part of the test as not to be insisted upon too strongly.

We ask, then, sincerely, and for reasons which could be greatly extended, is it not practically impossible to retain in a measure which is coercive and restrictive, the difficult, debatable, and, in my view, impossible, testing of architectural qualification? The art of architecture had better be excluded from the Bill, and with it any special application to architects. So that the Registration Bill, having ceased to be an architects' measure, may with a useful consistency be extended by its promoters to embrace all the practice of building.

THE EFFECT OF REGISTRATION ON EDUCATION.

The case for registration appears to comprehend a limited compulsory education in architecture with the effect of a low ideal; and the case against registration to have freedom in architectural study and practice with the highest attainable ideal.

It will be urged that a compulsory modicum of education may be insisted upon. If confined to that knowledge of building construction capable of being tested by literary examination I will agree, provided that the modicum is fairly applied to all who build, without conferring any supposed peculiar qualification in architecture.

This modicum, in spite of all protests, will become the practical maximum of qualification, and the consequent effect upon the higher interests of education, that is, those interests beyond preparation for examinations, will be disastrous. The modicum must be easy and of low pitch, and such must consequently be the future standard level of the architectural profession. With a legalised moderation of attainment all educational bodies in these busy days will strive in vain; and in whatever interests registration may be promoted, those of education cannot be furthered by the creation of an inferior standard to our present indefinite mediocrity of attainment.

The fact that failure to satisfy the Council of Education and Registration will be an absolute bar to legitimate practice, and that extreme power is vested without appeal in its decisions, will, we may be sure, result in a wise and generous leniency. A rigorous standard enforced by penalties would be unpopular, and raise an outcry both against the administrators and against the principle of registration. Speaking quite broadly and, on my own behalf, making every reservation in using the illustration, it will not be possible to apply such a standard as at present is employed in the Associateship Final Examination by the R.I.B.A. for the purpose of registration. It will not, for example, be allowed to any examiners to say that because a candidate fails to define the specific terms of parts of Greek temples, or to write correctly the names of architects of centuries past, or to draw from memory the characteristic ornaments of dead races, he is not qualified to practise architecture efficiently.

In all such subjects as history, ornament, and design, it is inevitable that the sanction of penalties should involve the easing of the standard. Personally I do not suppose that a standard higher than at present maintained by the Royal Institute of British Architects' Intermediate Examination can be set up, a standard which the profession largely and with certainty do not now consider as qualifying for efficient practice.

This aspect of the effect of a system of compulsory examination has not yet been sufficiently considered, as a registration scheme cannot avoid lowering the standard of education, and this we cannot certainly now afford to encourage or imply.

THE RISK AND LIMITATIONS OF EXAMINATIONS IN ARCHITECTURE.

I cannot pass from this subject of the present condition of the programme of architectural education without remarking that a qualifying examination standard other than that of real work, which shall combine the results of literary study and practical experience with artistic sympathy in design, is impracticable.

The examination system necessarily separates building construction from architectural art, and this is done, of course, in all educational systems which have examinations, such as the Royal Institute of British Architects' scheme, for their prototype, and I fear to the detriment of a consistent study of architectural art.

Such education for examinations in architecture is upon partial lines, and cannot test that combination of artistic power and sympathy with building materials, construction and purpose, which is architecture, the separation into two elements dispelling the union in which it consists. Is not architecture a mysterious sympathy with building, the revelation of hitherto unrevealed ideals in mechanical and practical expression in building art? Can the practical art which we cherish, and in which we are judged by the ages, be divorced from the building genius of our generation (whatever it may be), and acquired from those surface forms and ecclesiological fables of the past which form the syllabus of art examinations in architecture?

Examination ideals cannot avoid tending to a pedantic and unpractical view of artistic

training, and a system of registration upon such examinations will become a serious and constant set-back, if not a death-blow, to hopes for an enlightened reform of architectural education. The divorce of Construction from Art, and their treatment as distinct subjects by lecturers and in classes, syllabuses and colleges, and by the Royal Institute of British Architects' Examination Board, is perhaps some explanation of the want of progress in an artistic and elevated architecture among the main body of young architects, and I think that it also has given ground for the proposed apotheosis of architectural education by coercive statutory examination, providing a *point du départ* for a registration movement.

PRESENT NEED FOR FREEDOM WITHOUT REGISTRATION.

Architecture, to have fair play, must regain for herself recognition as the art of building, her only test and appeal being through the expression of enlightened thought in building work of all kinds; therefore the proposed restriction of her exercise to a limited class, qualified and entitled by a set method of education for examination, will deprive her of the freedom of scope which is necessary for the regeneration of the arts of building at large.

Architectural education is clearly not in a fit condition in England yet to be crystallised into a rigid system. Upon the spontaneous freedom of our methods, upon the perfect liberty for the exercise of genius and taste wherever existing or felt, have risen up among us modern schools of ecclesiastical, domestic and decorative architecture which the more academic methods of Continental schools have wholly failed to produce. The English work of the past half-century that has excited emulation in foreign countries was evolved at home in fiery artistic controversy of great interest—controversy for which there will be no room with an examination board.

A consideration of the motive forces which have stimulated this growth will show how frequently the impetus has come from the research, interest and building work of many who were not strictly within the pale of professional architects, but who felt and enjoyed the open liberty of practice and thought. Are we not liberal enough to share in the artistic brotherhood which knows no professional limitations, and feel the fellowship of admiration for anyone who produces work of artistic force or simplicity of appeal? Let us not take architecture out of the category of liberal arts and confine its exercise to a close corporation, such as a barristers' inn, or an attorneys' roll-keeping society with its unpleasant associations.

Is the world as ignorant and unable to distinguish real architects from unreal, as the promoters of registration affirm?—an assumption uncertain and unsafe, and, indeed, contrary to the public interest; and does not every man exercise his own responsibility in the selection of agents and advisers? Can we not rather hope that a widening and deepening enthusiasm for architectural art, and a greater attainment to sympathy with it, both in education and practice, will so mark the work of the true architect, that everywhere he may be content to rely upon the freedom of action open to all artists, rather than upon a legal title of no architectural value, and build so as to earn for himself that larger reputation and emolument that he perhaps secretly desires? In so doing he can exhibit in his work the subtle and not easily defined sympathy with building art, which is the true mark of the architect, and which I am persuaded the public of to-day and to-morrow will not be slow to recognise.

In business qualification and capacity the public can well be trusted to look after its own interests in selecting advisers.

In increased scientific education and qualification, let us join with all who will strengthen existing legislation in wise directions.

In professional matters, and in union for self-defence against unworthy practitioners, let us strengthen the hands of the Institute and appreciate the value of its influential, if more private efforts, to raise the personal standard of respect for and in the profession.

And in educational matters let us preserve as of incalculable importance the free and full attainment of architectural sympathy with all noble building, by all means of study, without supposed limit of qualification, and let us finally unite with each other in more earnest brotherly sympathy as the exponents of one of the most permanent means of national expression, grateful for its universality and for the invigorating freedom of the exercise of noble ideals in building art.

THE STATUTORY TRAINING AND REGISTRATION OF ARCHITECTS.

By W. HOWARD SETH-SMITH.

Read before the Leeds and Yorkshire Society of Architects, 11th February 1904.

IT is doubtless due to the English love of sport that the Leeds and Yorkshire Architectural Society has pitched upon the two supposed champions of the opposing forces in the registration campaign to fight it out in the central arena of Leeds. We can at any rate reckon on your equally innate love of fair-play in forming a judgment as to the merits of the arguments advanced on either side. My admiration and respect for my old friend and opponent is my measure of the honour done in selecting me to greet him on this occasion. Had not so powerful an advocate been forthcoming for the opposition, the registration movement would not have made the vast and rapid advance it has recently shown. This fact is at once the most eloquent evidence of its soundness and the certainty of its realisation.

Your Society is so well up in the history and literature of the question that I shall not attempt to reiterate many of the arguments recently advanced in the columns of *The Times* and of the *Institute Journal* (in reply to those put forward by the Council). These letters, and some other publications, including addresses by your own Presidents, fairly cover the ground in answer to the objections of our opponents. I leave readers to say which side has offered the largest array of facts and the most convincing reasons for their opinion. To-night I purpose taking wider ground.

Like the Quaker who said he would fight for his principle of "peace at any price," a retiring disposition such as mine has been forced into action; but still clings more to the points of agreement than to those of contention. What, then, is the main point of agreement? This certainly, that a well-trained man is a better architect than the same man without a sound professional education. The battle rages round the question whether tests of the training should be applied with a view to granting a diploma; whether those tests should include art, and whether they should be optional or compulsory. We believe our opponents agree to the first proposition, but resist the other two. In the ranks of architecture there has happily arisen a strong reaction against the assumption that a man who is well qualified

in construction and sanitary science is an architect apart from his possession, or non-possession, of designing power—a cultivated taste and skill in representing his ideas on paper. We hold that, failing any art qualification, a person has no right to the title of architect. It is objected that artistic qualifications cannot effectively be brought to the test of examination. The enthusiasm for the art side of our calling is fascinating and contagious, and this fascination is so irresistibly felt by many young architects who have not the ballast of a professional experience, that it constitutes a very real danger to the future of architecture; for let us remember—(1) that a man is not necessarily any the worse designer because he is a good builder; (2) that we cannot regulate the training of the profession generally on the lines of the experience of a few exceptionally able men who have attained distinction—in spite, perhaps, of an imperfect knowledge of construction—by the sheer force of their originality and skill as designers. It is absurd to say that such men would have been excluded by the proposed tests; we must deal, as in all other professions, with the average man and establish a curriculum which will raise the standard of the craft generally.

We are essentially and notoriously a practical people, and therefore the men who obtain the largest practice will be those who combine with considerable artistic ability exceptional technical knowledge and capacity for the multifarious business of which every architect's practice is, and must ever be, largely composed. But very many men whose works declare them to be absolutely devoid of taste or power to design, manage to obtain and keep a good practice. Why? For the simple reason that every client can recognise business and constructive ability, but comparatively few want good design, or can discriminate between the good and bad; hence the great importance of an art test as a qualification to practise, if British architecture is to make progress.

In an art such as architecture, which is as costly as it is unalterable, the matters of primary importance to the public must ever be good planning, economical and good construction, durability of material, and excellence of the drainage, water supply, ventilation and heating arrangements. These requirements are felt even more forcibly by the majority of our provincial brethren, who are bound to be all-round men, and by those who fill the posts of architects and surveyors to County Councils, and the rural and urban authorities, posts which involve such great responsibility for the health of the public. Once satisfy the public that we are competent to control all branches of the building trades, and in other matters—in connection with contracts, building regulations, &c.—to satisfy their interests, and we have at once created a basis of employment in which our artistic acquirements will find their opportunities. To pose as great artists does us more harm than good, for there is a firm conviction in the public mind that the more artistic the less practical and business-like a man is. Herein lies the mistake in the analogy too often drawn between architects, painters, and sculptors. Away with the unworthy and ungenerous taunt that this movement for a higher standard of education emanates from those who regard architecture mainly as a business. We all practise it as a livelihood. But, even were it not so, the fact that those whose practice is mainly utilitarian should be foremost in claiming a better standard in both the art and the science is of the happiest augury in the future interests of the art.

Why do the public so often apply to builders direct for much important work instead of approaching architects? And why do our public bodies employ surveyors and engineers to design our public buildings? Unquestionably because they do not believe the attainments of architects are, as regards construction, superior, if equal, to those of builders, engineers, or surveyors.

Let me now reply very briefly to the arguments advanced by the distinguished President of the Royal Institute of British Architects in his Opening Address of the Session.

In the first place, we believe Mr. Aston Webb has altogether under-estimated the grievances of the profession, and the proportion of architects who favour registration, especially amongst the members of this Institute. It is not merely provincial architects who feel the injustice of competition with unqualified men. Moreover, it is impossible, under present conditions, to penalise unprincipled and unprofessional conduct. The growth of opinion in this direction has been very rapid of late, and the knowledge that the duller and more lazy boys are now destined for architecture, nearly all other professions being closed, is having a material effect in this direction.

This favourable opinion towards registration is shared, we happen to know, by many artists equal in ability to any who are opposed, while many more are sitting on the fence, and many others among our opponents are not artists. We do not dispute the fact that a considerable proportion of the more successful men are against us, but they form a very small minority of the whole profession. While a real grievance exists, however, which affects the average architect, the required reform should be in the interests of the vast majority. Parliament will only require that the bulk of professional opinion, especially that of the Royal Institute of British Architects, be favourable before granting the necessary Act. The registration of every profession has been carried out in the face of strenuous opposition from the majority of its London leaders; but the benefits which the working of the Registration Acts have achieved, particularly in improved confidence of the public, have quickly converted these opponents.

With further reference to the arguments that "genius and position ought to count above numbers," we would remind *The Builder* that the history of civilisation gives an emphatic contradiction to the proposition. Reform has almost uniformly been wrung from those in power with the utmost difficulty. The natural tendency of aristocracy is conservatism, and nothing illustrates this fact more clearly than the history of the various Acts which have reformed our great professions in the direction of higher training and the expulsion of unworthy members. If we cannot admire the work of all who believe in registration there is no reason why we should not respect their judgment in this matter.

These more able and fortunate architects, as we can readily understand, are, as a rule, so engrossed in their large practice that they can give little heed to other subjects.

We strongly support a closer relationship of the arts of painting, sculpture, and decoration with architecture. It may be true that registration would not benefit these imitative and graphic arts; but we contend that these classes of artists, great as is our respect for them, are not competent to guide our opinion as to whether the training in an art, such as architecture, should be compulsory, an art in which the training differs so essentially, and where incompetence is fraught with such serious risks to the interests of the public as regards comfort, economy, and health. Believing as we do that the compulsory training of all architects would raise the standard of art, we hold that it would draw us nearer these sister arts rather than separate us from them.

We have no wish to shackle art, nor would registration do so, beyond refusing the title of architect to untrained men.

Now the common ground of agreement we have referred to is all we need whereon to found our plea for reform. We have no cut-and-dried theory as to the character of the training. If the proposed body of experts lately called together by the President of the Royal Institute of British Architects (as referred to in his Opening Address), in alliance with the Institute and its Board of Examiners, should succeed in establishing a more competent standard of training throughout the country, it will have earned universal honour and the gratitude of the profession. But whatever be the curriculum, we trust that a thorough knowledge of building

construction will ever go hand in hand with drawing and design. Whether the schools should be academic, practical, or artistic, or a combination of these characters, does not, however, affect our present question. At all cost we must retain (as we do now, but shall be powerless to do later on) the curriculum of our schools under the control of architects, and not allow it to pass into the hands of general educational bodies. So far there are only two universities granting degrees in architecture, and although these are not statutory licences to adopt the title of "Architect," they are evidences to the public that their holders are highly trained men, and, as the curriculum and the examinations in these two instances are laid down and conducted by architects, we may accept them as satisfactory, if followed up by a term of practical experience in an architect's office.

The University of London and the Victoria University are contemplating the establishment of a similar degree; but it is to be hoped that the Senate of the former may agree to a joint examining board of the Institute and the University pursuant to the powers given them under the statutes.

This reference to examinations recalls the statement made at a recent meeting of the Architectural Association by Mr. Carøe, to the effect that there was a reaction on all sides against examinations as a test of education. I am glad to hear this, if, as I understand, the aim of the reaction is reform of the *abuse* of what is still held by all the highest authorities, notwithstanding its fallibility, to be the only practicable method of ascertaining whether a student has made profitable use of his opportunities.

We all know that it is the most valuable and necessary things which suffer the worst abuse; and educational examinations are no exception to the rule. It is merely "pass" or qualifying, and not competitive, examinations with which we are concerned; those, we mean, in which the object is to insure a certain standard; to sift out incapacity, and to ascertain that candidates have gone through a certain process of education.

Examinations are effective as stimulants, they serve as guides, and turn the energies into a definite channel. When a man is shown his work and is started in the way to do it, he becomes quite another being. Besides, examination shows what is meant by knowing a subject. They also oblige a person to be able to produce his knowledge, and encourage him to bring it out in a terse and lucid style. They give no credit to loose or floating knowledge.

Pursuing the subject, and referring especially to *art* examinations, the Royal Academy finds it necessary to ascertain by this means whether its students are fit to profit by its instruction; and the Royal College of Art, where Professor Pite so ably occupies the Chair of Architecture, not only has an entrance examination, but tests its pupils at various stages of their studies, and, I presume, grants them a diploma as efficient art instructors when those studies are ended.

Now, it appears to me that we could not do better than follow the lead of the authorities of the Royal College of Art and the Royal Academy, by imposing similar art tests on architectural students wishing to enter our various schools, and thus ascertain at the outset of their careers whether they have any capacity for architecture. The Royal Institute of British Architects might admit to their examinations those only who had passed through schools in which such entrance examinations existed. Were these entrance tests well devised, more would be done towards achieving a higher standard in design throughout the profession than by any other means. So much as a guarantee of training. Then let our Fellowship be an Honours degree in design, open to all whose *executed works* proclaimed them worthy of the distinction. So long as the policy of the Institute is to promote art by conferring its highest marks of favour upon those whose works prove them to be the best architects, the Institute has everything to gain and nothing to lose by supporting this movement. The number of

men qualifying in the various schools under a system of registration will be far larger than now, and there is every reason to believe they will be keen candidates for membership.

Costly education is the most valuable property a man can possess, and we are merely proposing to safeguard the rights of this property, a principle universally admitted by the Legislature.

It is interesting and instructive to read the history of this question of an architectural diploma as discussed in the Royal Institute of British Architects and the Architectural Association meetings between the years 1855 and 1890. Those discussions mainly arose, as we all know, out of a memorial from the students themselves, the Architectural Association praying the Institute, as the senior body, to establish examinations, in the following terms:—

"The members felt the necessity of something like a diploma, and they were willing to submit to an examination to obtain an opinion on their professional merits and attainments. They were exposed to competition, and that competition could only be met by showing that architects possessed superior attainments beyond the reach of those with whom they had to compete for public favour. With regard to the future of architecture, the great object to be desired was a test by examination, which would eventually serve as a basis for the issue of such a diploma as should certify that the holder is fully qualified to practise."

After a vast amount of opposition in high quarters, these examinations were instituted, and the ever-growing demand proves that they are a felt need. And bear in mind that this opinion is not ours alone, but is that of more than one International Congress of Architects, and, we believe, of the majority of the members of the Institute and its Allied Societies. As Professor Simpson said at the recent discussion at the Architectural Association meeting: "Whatever was done in architectural education must be on practical lines, and such as were suited to the conditions of everyday life, and to work we are called on to do *now*; and must not in any way attempt to revive methods of teaching which some hundreds of years ago were satisfactory. The conditions had totally changed. An architect needs imagination to conceive, as well as knowledge of building construction to carry out, his ideas, and a knowledge of drawing to express them properly." All three requirements, we are bold to say, can be examined, not as to degree, but as to character.

But a new objection has lately appeared. It is asked whether we have studied the disastrous effects legal registration will have on the Institute. Such a question should give us pause, for although the Royal Institute of British Architects cannot be said to be representative of the whole profession, it is a most powerful factor for progress and rightness in the architectural world.

It is said that, in the event of this Registration Act, young architects, even when examined by the Institute, would rest content with the legal diploma entitling to practise, and would not seek membership of that body. Precedents do not confirm this pessimistic view. On the contrary, the Royal College of Surgeons blocked the Medical Reform Act of 1858, to within a few months of its passing, on this very ground, but the result of the Act was largely to enhance its revenue from the examinations, as well as its status, notwithstanding that there were at that time not less than twenty-one examining bodies in competition with the College. We have in the Royal Institute of British Architects a body which, if the necessary powers are obtained, may at the present time secure the examining of all architects for the statutory diploma. The result of such an Act would probably be to make the Fellowship practically essential to architects seeking appointments to important corporate bodies. I have no shadow of doubt that the accession of income from the examination fees would enable us to pay our examiners, and at the same time to reduce the subscription both of Fellows and Associates to one half, which policy would probably result in doubling the membership.

In 1902-3 the income of the Royal College of Surgeons from examiners' fees was £14,365, and after deducting examiners' fees, £8,050, there was a balance of profit of £6,315. The College has now twenty-four competitors. The Law Society, which was charged by the Solicitors Act with the sole right of examining for qualification to practise, gives no title to its members, yet with fees of two guineas for the 3,411 town members, and one guinea for provincial, it has obtained a membership of 7,822 out of a roll of 16,203 practising solicitors, and showed last year a balance of income over expenditure of £6,541, after paying all examiners' fees.

Finally, it is urged that our movement, if successful, will destroy the little cohesion at present existing among architects, and our opponents even threaten secession from the Royal Institute of British Architects! This is scarcely a dignified or English method of arguing an important question. If the vast majority desire registration we must adopt it, and under the proper safeguards (which, no doubt, any Bill drawn by the Institute would contain), all the interests of art, the Institute, the public, and the profession, will be provided for, and we venture to predict that a common standard of qualification, so far from disintegrating, would cement our scattered units in the bonds of mutual confidence, respect, and brotherhood. All other efforts have failed to achieve this.



9, CONDUIT STREET, LONDON, W., 5th March 1904.

CHRONICLE.

Election of the Royal Gold Medallist.

The Special General Meeting summoned in accordance with By-law 64 for the purpose of electing the Royal Gold Medallist for the current year was duly held last Monday, and resulted in the unanimous election of the Council's nominee, M. Auguste Choisy [*Hon. Corr. M.*]. After moving the Resolution as printed on the notice-paper, the President briefly touched on M. Choisy's claims to the honour as the author of literary works "tending," in the words of the regulation, "to promote or facilitate the knowledge of architecture or the various branches of science connected therewith."

M. Choisy, born in 1841, is the son of an architect. He studied art at the Polytechnic School, Paris, under the eminent master, Léonce Reynaud. At the age of twenty-two he entered the Service des Ponts et Chaussées, and devoted his leisure to architectural study. Travelling in Italy, Sicily, and Greece, he studied the Roman methods of construction, and gave to students the benefit thereof in his "Art of Building among the Romans," published in 1873. In 1882 appeared the result of further studies, "The Art of Building among the Byzantines." His lectures on architectural history at the School of the Ponts et Chaussées suggested his great work "The History of Architecture," which took over twenty years in accomplishment, appearing in 1898.* Others of his works are "Studies in Greek Architecture," published in 1884, and his latest, "The Art of Building among the Egyptians," reviewed by Mr. Phené Spiers in the JOURNAL for the 23rd January last. A Paper on "Byzantine Architecture" was contributed by M. Choisy to the Institute TRANSACTIONS of 1892.

The following is the Resolution passed at the Meeting:—"That, subject to His Majesty's gracious sanction, the Royal Gold Medal for the promotion of architecture be presented this year

to M. Auguste Choisy [*Hon. Corr. M.*], Inspecteur-Général honoraire des Ponts et Chaussées, Paris."

The Fellowship Question.

The first business on the Paper at the General Meeting last Monday, after the election of members, related to the question of the election of Fellows, and resolutions proposing alterations in the By-laws governing the elections were brought forward by the President on behalf of the Council. In introducing them, the PRESIDENT stated that there had been considerable feeling about the matter, and that dissatisfaction had been expressed at the way in which Fellows were at present elected. It was thought by many that the time had arrived when candidates for the Fellowship should, except in very special cases, be chosen only from the ranks of the Associates, in order to carry out the resolution formed by the Institute some years ago, that gentlemen seeking election as Fellows should be required to pass such an examination as was considered by architects desirable for those who were practising their profession. This could be best done, it was considered, by requiring all candidates for the Fellowship to pass first of all through the ranks of the Associates. In order to bring this about, some notice must be given, as there were doubtless many architects whom they could hardly expect to enter for the examination, and yet whom they should be very sorry not to include in the ranks of the Institute. It was therefore proposed that after the 31st of December 1906, every person, except in cases of specially distinguished men, should pass through the ranks of the Associates before being admitted as a Fellow, and this was what the Council asked the General Body to agree to. The Resolutions, notice of which had already been given, were then moved by the President as follows:—

"That the necessary alterations to the By-laws be drafted and submitted to a Special General Meeting to provide that after the 31st December 1906 every person desiring to be admitted a Fellow shall be required to have passed the Examination or Examinations qualifying him as an Associate; but that, in exceptional circumstances, the Council shall have power to dispense with such Examination or Examinations."

"Further, that during the intervening period the doors to the Fellowship be opened wider than at present, so that no reputable architect eligible under the charter for election who desires to join the Institute as a Fellow should be debarred from doing so."

In reply to Mr. T. H. WATSON [*F.*], the PRESIDENT stated that the Resolutions were brought forward merely to ascertain the opinion of the

* See review by Professor Atchison, R.A., JOURNAL for 10th Dec. 1898.

Institute generally on the question. The proposition entailed alterations in the By-laws, which would have to come before the General Body on a subsequent occasion and be passed by the requisite majority.

Mr. G. A. T. MIDDLETON [A.] asked for more definite information as to what was meant by opening the door of the Institute wider. Was it intended, for instance, to admit persons who would not be admitted under ordinary circumstances?

Mr. THOMAS BLASHILL [F.] said he had taken considerable interest in the question, and had felt for a long time that much too small a proportion of the practising architects were being admitted into the Institute. He confessed, however, that he did not like the present proposal. It meant apparently that for the next two years they were to admit persons to the Fellowship by a very much easier process than had been the case hitherto. This would lead to a very undesirable state of things: it would be thrown in the teeth of Fellows so admitted that they had been let in by a back door, as it were, without passing the ordeal that others had had to pass. His own view was that without any formal resolution they should let it be known, as it was not known at present, that practising architects who were fully qualified would be welcome. That was all that was wanted. Every difficulty, every discouragement that there had been was of their own creation. He had had some experience on the Council, and he knew that persons fully qualified and properly recommended had been put through a kind of informal examination at the Council and rejected without, in his judgment, sufficient reason. The present proposal seemed to show that to some extent he had been right in his view. He thought it most undesirable that there should be a resolution standing upon the Minutes of the Institute that during a certain period they should admit to the Fellowship persons with fewer credentials—less weighty credentials—than had hitherto been required. His own opinion at the present moment was that there was no such rush to come into the Institute as they seemed to apprehend; and he did not think that a resolution of that kind would have the effect of bringing men in who would not otherwise have come in. There were many architects outside the Institute whom they esteemed very highly, and he thought it would be a wise thing for the Council to ascertain why they held aloof. For a long time he had hesitated, and, as a rule, had declined to sign the papers of anybody, because he felt that the criticism which their candidature passed through before the Council was not such as the Charter contemplated or the By-laws warranted, or such as was wise, looking to their position as an Institute. It was impossible to say that the Institute represented the profession in the degree and to the extent that they wished.

There were too many competent, too many creditable men outside, who if they would come in would make the Institute strong. The fact that they were not members made the Institute weak. What the Council should do was to make it clear that they welcomed the good and the qualified persons, that is to say, persons qualified under the Charter. The speaker concluded by suggesting the formation of a Committee to consider the steps that ought to be taken to bring this about.

Mr. WILLIAM WOODWARD [A.] said he differed from Mr. Blashill. He thought that, as they had in the past left to the Council the selection of men as Fellows, who had entered without passing an examination—and he assumed that the Council had carefully examined their qualifications—in the same way they would be perfectly safe during the proposed interval of two years in leaving the nominations to the Fellowship in the hands of those who had hitherto used their discretion in a way which had certainly brought no discredit to the Institute. This was not a friendly invitation to men who were now outside the Institute to become Fellows, but it was a reminder that, after the date specified, no man would be able to enter the Institute who had not passed the examination for the Associateship. That was the important part of the matter. He thought himself, and he was expressing also the views of two or three others who had spoken to him upon the subject, that this was a matter which should be passed in the way it had been brought before them.

Mr. E. W. HUDSON [A.] said that some of those who in middle life had elected to pass through the mill and become Associates felt that they were especially indebted for the care that had been exercised in the admissions to Fellowship, to prevent others entering, as it were, by a side door. He did not see, however, unless that care and that particularity ceased to be exercised, how the door of the Institute was to be opened to those who were now outside. They were all most desirous that their ranks should be swelled to the utmost extent, and that all architects of reputable character and experience should enter into the Fellowship. But it would be a very unwise thing to hint in any way that the care and restrictions which had had good effect in the past were for a time to be suspended. He suggested that the second part of the resolution be omitted.

Mr. PAUL WATERHOUSE, M.A. [F.], asked whether the necessities of the case in relation to the second clause might not be met by making it an instruction to the Council and to the Allied Societies, instead of passing it in the form of a resolution. It occurred to him that, as now worded, in the event of an architect being shut out on application during these intervening years, a slur would be cast upon him; and the rejected candidate would have no option but to

assume that he was looked upon as a disreputable architect. For that reason, if for no other, the clause should either be reworded or treated as a sort of private instruction.

Professor BERESFORD PITE [*F.*] suggested that the proposed opening of the doors only needed to be explained, and then it could be left out of the resolution. There was a feeling abroad, he believed, that the Council exercised a sort of closing of the door upon applicants for the Fellowship; that to be a Fellow required a higher qualification in architecture than to be an Associate. The Council desired, however, and had desired for some years—*pace* Mr. Blasbill—merely to fulfil the obligations of the Charter, which provided that every reputable practitioner who had been in practice for seven years was eligible. They asked for drawings, under regulations made in accordance with the By-laws, in order to satisfy themselves that the applicant for Fellowship was an architect in actual practice, and conducted his practice himself. He therefore had to show drawings that he had done himself, and photographs of his buildings. The point of the resolution was to make it clear that the application for Fellowship accompanied by drawings was not in any way an artistic difficulty, that it was not an artistic examination, and that the Council did not sit upon those works critically. The intention of the resolution was—that every reputable architect who had been in practice for seven years was to be welcomed within the Institute, in order to make the Institute more widely representative of the existing practitioners of the art. After the period of two years applicants for the Fellowship would have to pass the Associateship examination. Here again, indeed, their artistic capacities would scarcely be put to any test—it was simply their ordinary workmanlike dealing with everyday problems that they would be set to satisfy the Examination Board in. The speaker concluded by urging Associates of old standing to send in their applications for the Fellowship.

Mr. H. HARDWICKE LANGSTON [*F.*], referring to the first part of the resolution, observed that he entered as an Associate in 1881, before the present qualifying examination was instituted. Should he be required to pass this examination before he could be admitted as a Fellow? If that were the case, he contended, he and Associates similarly situated would be deprived of their constitutional right to proceed to the Fellowship if otherwise eligible. He asked that the point be made perfectly clear, for they were not only proposing that certain changes in the By-laws should be submitted to a Special Meeting for adoption, but they were committing the whole body of members to a principle.

Mr. A. SAXON SNELL [*F.*] proposed that the second paragraph of the resolution be omitted. If the door were opened wider he was afraid

members would get in who were not quite desirable. Considering the applications the Council would receive, and have to refuse, in the interest of the Council themselves this proposal should be put rather as an instruction, as a sort of general hint, and not as a formal resolution.

Mr. JOHN SLATER, *Vice-President*, agreed that the second part of the resolution was hardly a matter for the meeting, because the resolution under which the Council acted was not framed by the General Body but by the Council themselves. It would be better to leave it to the Council, as had been suggested. With regard to the point mentioned by Mr. Langston, there was a certain amount of ambiguity about the wording. But if there was no qualifying examination at the time an Associate was elected, he did not think the Council or the General Body had any right to say that he could not go to the Fellowship if he wished.

This point was spoken upon by subsequent speakers, and it was ultimately agreed to treat the motion as two distinct resolutions; and with regard to the first, on the proposal of Mr. H. H. Langston, seconded by Professor Beresford Pite, the Meeting agreed to insert the words "or shall be elected from the ranks of the Associates" after the words "Examinations qualifying him as an Associate." The Resolution finally passed with these words inserted.

Mr. MAURICE B. ADAMS [*F.*] said he did not quite gather whether the present system of ascertaining from candidates for the Fellowship their capabilities as architects, by examining drawings and photographs, was to be continued, or whether by opening the door wide it was to be implied that these things were not to be asked for. It seemed to him eminently essential that such drawings and photographs should be required. He remembered the case of a candidate who was excluded—a man who occupied the position of mayor of the town where he lived, and in every way a desirable man; but the fact that he had to present the Institute with photographs and drawings of his buildings quite floored his candidature as a Fellow—and quite rightly too, he thought, because the Institute was a body of architects. He thought the second part of the resolution would be rather unwise. On the one hand there were outsiders, eminently artistic architects, whom apparently they could not induce to come in; and then there were others who scarcely ranked as architects at all, and yet for some reasons they should like to have them there, if it was only to have a sort of lien upon their conduct, for that really was a not unimportant feature in belonging to such a Society as theirs. They did not want to hawk the Fellowship round to people; but could they not in some way find out a means of making it known to every one that they really wanted them to come in? He quite agreed with the first part of the resolution;

in fact the first part was inevitable. As he understood the President, the reason why this matter was brought before them that evening was in order to ascertain what the rank and file of the Institute thought on the subject; he hoped that under no circumstances would they give up the practice of having drawings and photographs, so that they might be sure of getting architects in their ranks rather than auctioneers and the like.

Mr. C. H. BRODIE [A.] proposed that the second paragraph should read: "Further, that during the intervening period no reputable architect eligible under the Charter for election who desires to join the Institute as a Fellow shall be debarred from doing so." That, he thought, would get over the objection which many members besides himself felt on reading this paragraph.

Mr. EDMUND WOODTHORPE, M.A. [F.], said he felt it would be better to leave out the second resolution altogether. The resolution, he thought, was the result of the past action of the Council in sometimes debarring candidates from being put forward as Fellows, without knowing anything about them. He felt strongly on the matter, because he—and also one or two members of the Council present, though they had not referred to it—had put forward candidates from the City who had been rejected without proper cause. One of their most respected members, who had now passed away, was very much hurt on this account. For many years past there had been a feeling of great soreness at the action of the Council with regard to people who were not admitted, but who certainly ought to have been. One or two members felt it so strongly that they had declined to propose other people. He thought the Council did not want this instruction at all. If they wanted any one in, they could let him know that he would be admitted if he came forward. This, however, might possibly set some of the most desirable men against coming in.

Mr. HUGH STANNUS [F.] said he thought it very undesirable that the second resolution should go out to the public. It would be better to approach suitable candidates and let them know that the Council would consider their applications with a certain amount of favour. It would be *infra dig.* for the Council to do this; but if they could refer this matter to the Practice Committee, inviting them to communicate with the Allied Societies, they might, after a month or two, settle upon a list of reputable people whom they should invite unofficially.

Mr. WILLIAM WOODWARD [A.] thought the proposition made by the last speaker absolutely impracticable. If they were to do it at all, it must be done on a printed form and be communicated to every member and every architect in the kingdom.

Mr. DOUGLASS MATHEWS [F.] suggested that some of the present Associates should be communicated with and urged to proceed to the Fellow-

ship. That might help to popularise the Fellowship, and suggest to those who were not Associates to take the opportunity of becoming Fellows.

In reply to Professor PITE, the PRESIDENT said he thought Mr. BRODIE's amendment a good one, which might be accepted.

Mr. PAUL WATERHOUSE [F.] said he should be glad to support the amendment if the word "reputable" could go also.

Mr. BRODIE agreed, and the resolution, as amended, was read as follows:—"Further, that during the intervening period no architect eligible under the Charter for election who desires to join the Institute as a Fellow shall be debarred from doing so."

The PRESIDENT objected to the latter part of the Resolution as being open to the interpretation that eligible candidates were at present debarred from joining the Institute, which was not the case.

Mr. FRANK LISHMAN [A.] thought it would be safer to omit the clause altogether.

Mr. DOUGLASS MATHEWS [F.] suggested that the President's objection could be met by altering the resolution as follows: "Further, that during the intervening period every architect eligible under the Charter for election who desires to join the Institute as a Fellow should be encouraged to do so."

Mr. BLASHILL agreed that the resolution might be passed in that form.

Mr. BRODIE withdrawing his amendment, Mr. Douglass Mathews's, seconded by Mr. Hugh Stannus, was put from the Chair and carried unanimously.

Amended "Suggestions for the Conduct of Architectural Competitions."

The Meeting then proceeded to the consideration of the following amendments to the Paper of "Suggestions for the Conduct of Architectural Competitions":—

Clause 2 (a) to read as follows:

"To draw up the particulars and conditions (as far as possible in accordance with the principles herein set forth) as Instructions to Competitors, and also to advise upon the question of cost and the amount and apportionment of the premium or premiums."

Note.—In drawing up the Instructions to Competitors it is desirable to divide them into two distinct classes:

(i.) *Conditions*—i.e. those which must be strictly adhered to.

(ii.) *Suggestions*—i.e. those which are merely optional or of a suggestive character."

Clause 7: Delete entirely.

Renumber clauses 8, 9, 10, 11 as 7, 8, 9, 10 respectively.

Clause 12: Delete all first paragraph and renumber the second paragraph beginning "It is essential . . ." as clause 11.

Add the following clause as the new clause 12:—

The author of the design placed first by the assessor or assessors should be employed to carry out the work, and he should be paid in accordance with the Schedule of Professional Practice as to the Charges of Architects sanctioned and published by the Royal Institute. If no instructions are given to him to proceed within twelve months from the date of selection, or if the proposed works are abandoned by the promoters, then the selected architect should receive payment for his services in connection with the preparation of the competition drawings of a sum equal to 1½ per cent. on the amount of the estimated expenditure.

Mr. SAXON SNELL [F.] asked if he could move an addition to clause 1 of the "Suggestions."

The PRESIDENT said it would be out of order at that Meeting. Notice must first be given.

The clauses being taken *seriatim*, Mr. A. W. S. CROSS, M.A. [F.], moved, and Mr. C. E. HUTCHINSON [A.] seconded, clause 2 (a) as amended, which was thereupon put from the Chair and carried.

With regard to the proposed Note suggesting the division of the Instructions to Competitors into "Conditions" and "Suggestions," the PRESIDENT observed that members would remember a case recently before them in which that question had arisen; and it was thought desirable to put it a little more clearly, both to Assessors and to Promoters, that if some of the conditions were meant merely to be suggestions and not absolutely binding, it was only fair to competitors to point that out.

Professor BERESFORD PITE [F.] suggested leaving out the words "to competitors," so that the clause would read: "In drawing up the Instructions it is desirable to divide them into two distinct classes." It was not the intention to draw up the competitors and divide them into two distinct classes!

Mr. WILLIAM WOODWARD [A.] moved the insertion of the Note as amended, and Mr. E. W. HUDSON [A.] seconded, it was put from the Chair and carried.

The PRESIDENT, coming to the next point, said that clause 7 was deleted entirely because it appeared later on, and that necessitated the re-numbering of the clauses below it. Then, instead of clause 7, they proposed clause 12 as follows: "The author of the design placed first by the assessor or assessors should be employed to carry out the work, and he should be paid in accordance with the Schedule of Professional Practice as to the Charges of Architects sanctioned and published by the Royal Institute. If no instructions are given to him to proceed within twelve months from the date of selection, or if the proposed works are abandoned by the promoters,

then the selected architect should receive payment for his services in connection with the preparation of the competition drawings of a sum equal to 1½ per cent. on the amount of the estimated expenditure." The object was to insure that committees should not get designs for a small nominal sum and then throw the whole thing over; they would have to pay a fair sum, as they would have to do if they instructed an architect in the ordinary way. Replying to Mr. E. W. HUDSON [A.], the PRESIDENT said it was proposed that it be left to the assessors to decide about the premium. The idea generally was, that there should be no premium to the first man, that he should get the work, and the premium should be given to the second, third, fourth, and so on. That would make it still clearer that they competed for the work, and not for the premiums.

Mr. SAXON SNELL [F.] thought the clause should be made a little clearer. It says "The author of the design placed first by the assessor or assessors should be employed to carry out the work." Those who had acted both as competitors and assessors knew that there were cases where it would be very hard upon the promoters to bind them to appoint the winning competitor. There were, fortunately for architecture, a number of very clever young men who might be able in an open competition to prepare such a plan as would easily take first place; but they might hesitate very strongly before placing works in the hands of a merely very clever young man. Promoters might very reasonably say that, being responsible to the public, they would not entrust the work to such a man.

The PRESIDENT: There is a clause here which seems to meet the point. "It is essential to the success of any competition that the award of the assessor should be adhered to unless there is some valid objection to the employment of the author of the selected design to carry out the work, as to which the assessor is satisfied."

Mr. SAXON SNELL, continuing with regard to the payment of 1½ per cent., said it represented, he believed, the maximum which an architect was entitled to ask from a client who abandoned a plan. Although the Institute Charges were not divided so clearly as that, he did not think any of them would have the courage to ask for more than 1½ per cent., whatever trouble they had been put to in preparing sketch designs. The tendency very rightly was to make competitions much easier for the competitors in the way of expense than they used to be. It was becoming the custom to suggest that the competitors should only supply sketch drawings in pencil; and, as they were asking that, and considering the tendency to make matters easier for competitors, it was a little bit hard upon promoters that they should pay as much as 1½ per cent. On the one hand competitors were asking pro-

motors to pay the maximum, and on the other hand promoters were urged to ask from competitors very little indeed. There appeared to be an inclination to forget that these Suggestions were in the first place for the benefit, not of competitors, but of the promoters of buildings. Promoters were to understand when these Suggestions were put before them that they were for their own good; that if they wanted to get the best from architects, they should conduct the competition according to the Suggestions. Therefore they should not make the conditions too hard. He, of course, was not there to advocate the cause of promoters; but he had so often heard clients say that they looked at it from the point of view of business men—that they could not be concerned with what architects thought their own value; but they looked at it from the point of view that they wanted to get the best they could for the promoters. Therefore they should think of the promoters rather than of themselves.

The PRESIDENT: But are you not overlooking the fact that these promoters are asking perhaps 100 or 150 architects for plans, and that they are only paying for one after all? That makes a great deal of difference.

Mr. SAXON SNELL: Yes; but we are asking them on the one hand to make the burden upon us very light, and on the other hand we are asking them to pay the maximum price.

Mr. H. K. BROMHEAD [F.]: There is another side to the question. If promoters pay 1½ per cent., they will get a larger number of designs and better people to compete for them.

Mr. H. VAUGHAN LANCHESTER [A.] pointed out that the 1½ per cent. came in only if the promoters abandoned the building; and they wanted to discourage such abandonment. It was a fair percentage for sketch plans. It might be said that the architect, if there had been no competition, would have taken a little less; but they ought to say that they would be subject to a certain penalty should they abandon their design.

Mr. SAXON SNELL: I sympathise with that view; but I merely wanted to point out the undesirability of making things too difficult for the promoters.

Mr. JOHN J. BURNET, A.R.S.A. [F.] said he cordially appreciated the position taken up by Mr. Snell. It was sometimes forgotten that any legislation that they adopted, in order to secure success in their own work, must be based upon a thorough appreciation of what they were going to supply. He felt that Mr. Lanchester in his remarks showed a little of the spirit that he complained of. They were not there to legislate for a public who showed any appreciation of architecture. People who began a competition, they must take it for granted, could not and did not know the value of an architect; they only knew he was a man who must be obtained to get tradesmen

together for the purpose of the building, and they were so indifferent as to the quality of that man, that they asked twenty or thirty to compete, and were content to take any of the twenty or thirty. Even if there was a clause which prevented their being obliged to appoint the man who won the competition, he hardly thought that in an open competition he as assessor could enforce that clause as against a young man on account of his youth. He held very strongly that in having an open competition people had made their own bargain, and were bound to take that man if there was nothing against him; that is to say, they must suffer for his inexperience. It had a value, and a very strong value. The assessors, he thought, should be free to judge, according to the importance of a building, whether they would advise an open competition or a close one. Personally he did not advise any persons to enter into an open competition where there was a heavy financial and administrative responsibility. It was extremely rash, and likely to lead to a lowering of the profession in the eyes of the public. That was one reason why a close competition was better than an open one.

Mr. A. W. S. CROSS [F.] moved the adoption of the clause.

Mr. C. E. HUTCHINSON [A.] in seconding, asked whether the Council, in drawing up the amended Suggestions, had taken into consideration the method in which they were going to enforce them. The Suggestions affected the promoters, the competitors, and the assessors, and if they passed them, it was a proof that the Institute meant to adopt them permanently. Therefore competitors should be in some way warned against competitions which did not meet the views of the Competitions Committee, and at the same time assessors should refuse to act where the conditions were unsatisfactory.

The PRESIDENT said that the Council through the Competitions Committee were intending to take what steps they could to induce members to abide by the Suggestions to the extent of declining to compete if they were not substantially adopted. As regards the premiums offered, architects were entitled to some extent to lay down certain rules to the public who invited a large number of them to submit designs. That was a very different thing from a man going to a single architect and commissioning him to erect a building: that was entirely a matter for the promoter and the architect. In the other case, however, architects were quite entitled to protect themselves to the utmost extent, at the same time believing, as they did, that the protection to themselves also ensured a better result to the promoters.

The resolution was then put and carried unanimously.

Mr. A. W. S. CROSS said he understood that if competing architects, members of the Institute,

were warned off a particular competition, assessors also members of the Institute would not be allowed to assess in such a case.

The PRESIDENT: I should hope they would not do so.

Mr. CROSS: Can we not prohibit them in any way? It seems unfair otherwise.

The PRESIDENT: Could you not bring that up at the Council?

Mr. CROSS: Yes, Sir.

Professor BERESFORD PITE said that at that late hour he was loth to say anything on the question, but he should like to utter a warning word as to enforcing, and prohibiting, and allowing. They were going to open the door for the Fellowship, and they must take care that they were not blocking the door that they were going to open wide. It must be remembered that the wider interests of individual members had to be considered, and in talking about enforcing, and prohibiting, and allowing, they were entering upon very difficult ground.

Mr. CROSS: But you put the competitors under the disability, and you do not extend that disability to the assessors. It seems inconsistent upon the face of it.

At the instance of the PRESIDENT the discussion then closed.

Mr. ARTHUR R. MAYSTON [A.] sends the following communication dated 1st March:—

With reference to the debate last night upon the new proposals for the conduct of competitions, nobody doubts, I think, the advisability of their adoption in the interests of the profession.

Unfortunately, however, they are only "suggestions." Surely the time has come when these should have the force of by-laws, and to be of any real benefit they ought to be adopted as such by all the members of the Institute.

These "suggestions"—I may almost call them rules—have been formulated by the Council, who after all represent the members of the Institute; they embody up-to-date experience, and, in the Council's opinion it is desirable that they should govern the conduct of all competitions. No steps are, however, taken to make an infringement of the same by members unprofessional conduct and so practically enforce them upon promoters, who will doubtless continue to disregard the representations of the Council as much in the future as in the past, knowing that they can get designs upon their own terms.

I would therefore suggest that all architects should be invited to subscribe their names to a declaration that they will not compete unless such conditions are complied with. I am sure such a declaration would be welcomed by all, as it would doubtless strengthen the hands of the Council, the assessors, and the competitors in dealing with refractory promoters.

The Registration Question.

At the same meeting, Mr. H. HARDWICKE LANGSTON [A.], in accordance with notice, put the following question to the Chair:—

Is it in the power of the Council to say whether it is the intention of the Registration Committee, in view of the great interest attached to the movement for the statutory qualification of architects, to take a poll of the members of the Institute upon the general principle involved?

In putting his question, Mr. Langston explained that, as it was admitted on all sides that, unless a majority of the members of the Institute were in favour of the movement, it would be useless to proceed any further with it, it struck him that the first step would be to take a poll of the members, so as to have the question answered in the negative or the affirmative. As the Council formed a part of the Registration Committee, he ventured to put to it this question.

The PRESIDENT, in reply, said that this was one of the questions which the Committee would doubtless consider; but as they had not yet met, it was impossible for him to express any opinion upon it. In asking a poll it seemed evident that they must first of all lay before members the *pros* and *cons* of the proposal. The Committee hoped to meet shortly—in fact they had fixed on a date that evening.

Prizes and Studentships 1904-1905.

The pamphlet giving full particulars of the Prizes and Studentships offered by the Institute for the year 1904-1905 will be issued to members with the next number of the JOURNAL. The prizes and subjects are briefly as follows:—

THE ESSAY MEDAL AND TWENTY-FIVE GUINEAS, open to British subjects under the age of forty.—*Subject*: "The Development of Architectural Art from Structural Requirements and Nature of Materials."

THE MEASURED DRAWINGS MEDAL AND TEN GUINEAS, open to British subjects under the age of thirty.—Awarded for the best set of measured drawings of any important building—Classical or Mediæval—in the United Kingdom or abroad.

THE SOANE MEDALLION AND ONE HUNDRED POUNDS, open to British subjects under the age of thirty.—*Subject*: Design for a Royal Palace on an open level site.

THE PUGIN STUDENTSHIP: SILVER MEDAL AND FORTY POUNDS, open to members of the architectural profession (of all countries) between the ages of eighteen and twenty-five.—Founded to promote the study of the Mediæval Architecture of Great Britain and Ireland, and awarded for the best selection of drawings and testimonials.

THE GODWIN BURSARY: SILVER MEDAL AND SIXTY-FIVE POUNDS, open to members of the architectural profession without limitation of age.—Founded to promote the study of works of Modern Architecture abroad, and awarded for the best selection of practical working drawings, or other evidence of special practical knowledge, and testimonials.

THE OWEN JONES STUDENTSHIP: CERTIFICATE AND ONE HUNDRED POUNDS, open to members of the architectural profession under the age of thirty-five.—Founded to encourage the study of Architecture, more particularly in respect to Ornament and Coloured Decoration. Competitors must submit testimonials, with drawings exhibiting their acquaintance with colour decoration and with the leading subjects treated of in Owen Jones's *Grammar of Ornament*.

THE TITE PRIZE: CERTIFICATE AND THIRTY POUNDS, open to members of the architectural profession under the age of thirty.—*Subject*: A Design, according to the Principles of Palladio, Vignola, Wren, or Chambers, for a Hotel Lounge and Staircase.

THE GRISSELL GOLD MEDAL AND TEN GUINEAS, open to British subjects who have not been in practice more than ten years.—Founded to encourage the study of Construction. *Subject*: Design for a Winter Garden in Iron and Glass.

THE ARTHUR CATES PRIZE: A SUM OF FORTY GUINEAS, open to British subjects who have passed the R.I.B.A. Final Examination at one Sitting during 1903 and 1904.—Candidates must submit (1) Selections of the testimonies of study which procured their admission to the Final Examination; (2) Not less than three sheets comprising studies of subjects of Classical, or Renaissance, and of Mediæval Architecture, accurately drawn in perspective and shaded by rule, and also detailed studies of a groined vault of any period between A.D. 1100 and 1500. The prize will be awarded for the best set of drawings.

THE ASHPITEL PRIZE: BOOKS VALUE TEN POUNDS.—Awarded to the student who distinguishes himself most highly in the Institute Final Examinations 1904.

Copies of the pamphlet will be on sale at the Institute, price threepence each.

The late Percival Gordon Smith [F].

Mr. Gordon Smith, who died last week at the age of sixty-four, was elected an Associate in 1866, proceeded to the Fellowship in 1879, and served for a time on the Council of the Institute. He entered the offices of the Local Government Board as assistant architect about 1868, and was appointed chief architect in 1879. This position he held until compelled to retire by the age limit nearly four years ago. To all appearance he was then in the full vigour of his powers, intellectual and phy-

sical, but shortly afterwards came the break-down in his health which has now resulted unhappily in his death. The Hon. Secretary, Mr. Alex. Graham, made feeling reference to the sad event at the General Meeting last Monday, and testified to those high attainments and amiable qualities which won for the deceased the respect and affection of his colleagues and of all who had relations with him whether in public or in private life. In this connection may be quoted Mr. H. D. Searles-Wood's testimony in reviewing for these pages Mr. Gordon Smith's book on *Poor Law Buildings*. "Those who have had the good fortune to submit drawings for the approval of the Local Government Board will have retained an agreeable recollection of the kind and able manner in which Mr. Gordon Smith criticised their works, and the valuable suggestions that he gave, doing his spiriting so gently that one left the building with the impression that all the suggested alterations were improvements" (*JOURNAL*, 27th July 1901). Mr. Gordon Smith was the author of two authoritative treatises on the Construction of Hospitals and Lunatic Asylums, and produced during the first months of his retirement the valuable work above mentioned, *The Planning of Poor Law Buildings*. At the General Meeting of the 29th ult. the regrets of the Institute at the loss it had sustained by his death were ordered to be entered on the Minutes, and a message of sympathy and condolence was directed to be conveyed to his family.—Mr. Gordon Smith's father was the late Charles Heriot Smith, who was educated for the architectural profession and took the Royal Academy Gold Medal, and afterwards became a decorative sculptor and worked for a short time in Flaxman's studio.

L.C.C. Building Conditions.

The London County Council, on the recommendation of its Corporate Property Committee, has agreed to the inclusion of the following provision in the conditions as to building on the Council's land:—

"If, and so often as the same shall happen, any dispute shall arise between the Council and the lessee as to any matter connected with the erection of the said building or buildings, or the foundations or drainage thereof, or the preparation, laying out, fencing or otherwise dealing with the said land, which matter is not provided for by 'the approved plans and specifications,' or any additions to, alterations in, or omissions from the same, authorised as aforesaid, or by these conditions, or conditions of approval, or as to whether any such matter is or is not so provided for, or as to the manner in which the same is provided for, every such dispute shall, if it arise before the plans and specifications have been approved, be decided by the architect, and if it arise thereafter be decided by an arbitrator to be appointed failing

agreement by the President of the Royal Institute of British Architects, whose respective decisions shall be final."

The Sixth International Congress of Architects.

As has been previously announced in the JOURNAL, the Sixth International Congress of Architects, under the high protection of H.M. the King of Spain and under the auspices of the Spanish Government, will be held in Madrid from Wednesday the 5th of April to the evening of Wednesday the 13th, when the farewell banquet will take place.

The Congress will sit to discuss the various questions they have before them on the 6th, 7th, 9th, 11th and 13th April. The 8th and 12th will be devoted to excursions to Toledo, Alcalá and Guadalajara, and to the various buildings of interest in Madrid, where an Exhibition of the Monumental Art of Spain will be in progress.

Subscriptions (£1 as *membre adhérent*) can be paid until the opening of the Congress; but in order to facilitate matters, it would be well if members thinking of joining the Congress would send their subscriptions as soon as possible to the Secretary of the Executive Commission, Señor Luis M. Cabello y Lapedra, Alcalá, 11, Academia de San Fernando, Madrid, so as to obtain their cards of identity and programmes before their departure from London. These cards of identity serve as vouchers, available from the 15th March to the 5th May, entitling the holders to a reduction of 50 per cent. on fares on Spanish and Portuguese railways, and 83 per cent. on those of the Compagnie de Navigation Transatlantique. The latest advices from the Secretariat state that there will be a reduction of 50 per cent. granted by the Compagnies Générales des Chemins de Fer de France.

The Secretary of the Institute will be happy to supply further information concerning the Congress, to which the Council are sending delegates as representatives of the Institute.

The French School at Athens.

M. Holleaux has been appointed Director of the French School at Athens in succession to M. Homolle [*Hon. Corr. M.*], now Director of the French National Museums. M. Holleaux, who is an old member of the School, was Professor at the Faculty of Letters, Lyons, having charge of the courses on Greek and Roman Antiquities.

NOTES, QUERIES, ETC.

L.C.C. By-laws requiring Deposit of Duplicate Plans of Drainage System [p. 209].

From HENRY LOVEGROVE [A.]—

I am pleased to see that Mr. E. T. Hall has called attention (on page 211) to a very real grievance of the building public. In my large district I hear much grumbling, as no purpose can be served by the deposit of drawings, and it is unfair to ask an architect, at the cost of his client, to send a complete set of plans for, say, a large factory, because it has been decided to add two new w.c.'s.

In the last paragraph of his letter Mr. Hall has well described all that is necessary for an application, and the mistake in the wording of the By-laws should be amended forthwith.

Sir John Vanbrugh [p. 213].

From GILBERT H. LOVEGROVE (*Student*)—

May I, as one who has studied the life of the eminent architect, add a few remarks to Mr. Oglesby's interesting Paper on Sir John Vanbrugh.

In justice to Vanbrugh (and to Swift) Mr. Oglesby should have continued his quotation from the poem on "Vanbrugh's house" as far as

"'tis own'd by all

Thou art well contriv'd, though thou art small."

The theatre in the Haymarket was not the first of his architectural works, the foundation-stone having been laid, on the 9th April 1705, by the Countess of Sutherland, daughter of the Duke of Marlborough, who was popularly known as "the little Whig."

A great part of the podium of the Clarendon Buildings, Oxford, which must have given considerable dignity to the design, has now been removed; Kneller Hall, Hounslow, was refronted by Hardwick, and, having been altered by other architects, is now quite unlike the design as originally carried out.

The writing of humorous epitaphs was a favourite amusement for the wits of the time, as witness that on Oliver Goldsmith by Garrick, and, further, there is no proof that Dr. Evans wrote his couplets after Vanbrugh's death.

I believe no biographer has noted that Sir John was (like Sir Christopher Wren) a Freemason. In the list of members of the lodge "Sunn in Chester," "as by account deliver'd at a quarterly communication held 27th November 1725," occurs the name of "Capt. John Vanberg."

Those interested in Vanbrugh's works (dramatic or architectural) will regret that Vanbrugh House, Westcombe Park Road, Blackheath, is now being destroyed, and Vanbrugh Castle, Maze Hill, is threatened. Both of these were apparently for his own occupation, their grounds being connected by a subterranean passage.

Treatment of Sewage by Bacteria.

In a Paper on this subject read at Leeds on the 22nd February Mr. W. J. Dibdin said that the difficulty experienced with the ordinary coarse or "first contact" bed in those cases where the crude sewage was turned directly on to it was that the interstices between the particles of coke or clinker, &c., became filled with the finely divided matter in the sewage and carbonaceous residuum from the bacterial action on the organic matters. The grit or detritus tank and the septic tank left a quantity of sewage sludge to be disposed of. In discussing the question as to what could be done either to prevent the putrefactive action in the tank, whether "septic" or "grit," or to increase the efficiency of the coarse or first contact bed, reference was made to the reports of the Manchester and Leeds Corporations, and Mr. Dibdin stated that in the case of a coarse bed filled with coke or clinker, &c., there were a number of solid particles presenting only an outer surface, the interior of the particles occupying space to no purpose. It occurred to him that this interior space could be utilised by the employment of a material of hollow form, so that it would present an interior as well as an exterior surface on which the bacteria could grow. After trying tiles, he made an experiment at Devizes, in which waste slate debris was used. The slates were supported about one inch apart by small slate blocks. This arrangement gave no less than 80 per cent. of water capacity to the beds, thereby doubling their effective working capacity as compared with coke, &c. In fact, the bed at Devizes was exactly one-half the size of the fine bed into which it discharged, with the result that the cost of construction of an installation was reduced 50 per cent. By the use of slates the chief causes of loss of capacity were overcome. The growth of organisms would take place on both surfaces of the slates, and would not choke the spaces between, as in the case of coke, &c. The facility of cleaning out the slate beds, it was stated, greatly reduced the cost as compared with clinker beds. Slate contact beds would be found not only the most economical but far and away the best means of destroying the foul mass of animal and vegetable matter called sludge. Slate, too, was inert, and formed an admirable home for the bacteria.

those present were Messrs. T. Winder (in the chair), E. M. Gibbs, J. Smith, C. B. Floekton, J. R. Wigfull, H. L. Paterson, T. Swaffield Brown, W. J. Hale, C. F. Innocent, Horace Wilson, W. G. Buck, H. I. Porter, C. Green, W. C. Fenton (Hon. Sec.), and others. Letters of apology for absence were received from Messrs. R. W. Fowler and C. M. Hadfield.

Mr. W. Gilbert (of the Bromsgrove Guild of Applied Art) gave a lecture on "Evolution of the Manufacturer in Art." The lecturer traced the origin of the guilds connected with craft from the earliest period, and referred to the beautiful work of the mediæval craftsman, when there was no division of labour, and when work was the pleasure of his existence from the time of his apprenticeship until he became full member of the craft. He also showed how great historical occurrences affected the guilds by developing art workshops and thus divorcing the artist and craftsman. The influence of Italian "commercial" artists during the Renaissance was next referred to at some length, and the various phases of craft work up to the nineteenth century. The institution of classes for designing in this country was also mentioned. In 1851 there were twenty-two such classes in existence. The influence of the Great Exhibition of that year on craftsmanship was described by Mr. Gilbert. The conditions which alone would produce good work in art classes, he thought, were that they should not be municipal factories, competing in any way with local manufacturers, and that they should not be the home of fads, but the home of thought. The lecturer commended individualism in art. Craftsmen owed much to architects. He alluded to the fine work of the late J. D. Sedding, especially at the Church of the Holy Trinity, Chelsea, where his work was combined with the craftsmanship of Onslow Ford, and others. The lecturer, in conclusion, pleaded for greater association between good workers in the production of good work, and especially between architects and the different craftsmen employed in building.

An interesting discussion followed, and on the motion of Mr. T. Swaffield Brown, seconded by Mr. Horace Wilson, and supported by Messrs. W. J. Hale, J. R. Wigfull, C. Green, E. M. Gibbs, W. C. Fenton, and W. F. Smith, a hearty vote of thanks was accorded the lecturer.

ALLIED SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS.

Evolution of the Manufacturer in Art.

The ordinary monthly meeting of the Sheffield Society of Architects and Surveyors was held on the 11th February in the Lecture Hall of the Literary and Philosophical Society, Leopold Street. Amongst

LEEDS AND YORKSHIRE SOCIETY.

Professor Pite and Mr. Seth-Smith on Registration: Discussion.

The sixth general sessional meeting of the above society was held on February 11th, Mr. Butler Wilson [F.], president, in the chair. A large gathering of members assembled to hear Papers on Registration as affecting architecture

and architects by Mr. W. H. Seth-Smith [F.] and Professor Beresford Pite [F.]. These Papers will be found printed elsewhere in the present issue.

Mr. G. BERTHEM BULMER [F.], in proposing a cordial vote of thanks to the readers of the two Papers, said that an intimate acquaintance with the student life of medical men had satisfied him that that profession was much better prepared for its work than the architectural profession, because of the necessity to arrive at a certain standard of knowledge before commencing practice. The bulk of architects nine months out of twelve were occupied with work which did not find scope for the higher artistic gifts, and he failed to see that the higher education which registration and examination involved could impede the more gifted from finding a place "at the front" as heretofore. The difficulties of the case had been met before in other callings, and doubtless could again. The public had a right to demand from architects a more intimate knowledge of the scientific details of their profession, which the artistic student will certainly endeavour to shirk unless compelled to pass a qualifying examination. The painter and the sculptor market their goods after competition, when the public can accept or reject them; but an architect's work is obviously in a very different category.

Mr. ROBERT P. OGLESBY, in seconding the vote of thanks, remarked that to say, as Professor Pite had done, that one cannot examine in art was but to enunciate a truism. There could be no divorce between the æsthetic and practical elements of architecture. Surely Mr. Pite would not advance the theory that a musician would be hampered in his aspirations because he had received a thorough grounding in harmonic law and contrapuntal science. The Professor's alternative was education in the most tempting garb that could be devised. "Education," continued Mr. Oglesby, "is to be handed round on trays. It is to be co-ordinated, and made to look as ambrosial as possible. The architectural millennium will then arrive, and the constructional lion will lie down alongside the artistic lamb. Of course, this is a very beautiful idea. But will the students rush for co-ordinate education any more than they do for the present excellent advantages which are offered? Not at all. You may lead the student to the educational waters, but, as things are at present, you will not necessarily make him drink. Mr. Seth-Smith's idea is more practical. He would take the student willy-nilly and plunge him head over ears in the crystal depths of education. Mr. Pite would probably remark, 'Ah! but remember the heel of Achilles.' Mr. Seth-Smith replies confidently that it will be a case of total and absolute immersion. The student will be thoroughly examined on leaving the water, and if there should be found on him one dry spot, in he

goes again. And more than this, with the establishment of registration the student will be only too willing and anxious to be dipped, anxious to be made as invulnerable against commonplace and mediocre thoughts and deeds as the educational stream will permit. This would do more than co-ordinate education; it would co-ordinate the profession. To raise the standard of training is to raise the standard of architecture, and it is not by optional but by compulsory methods that this end will be achieved."

Mr. C. B. HOWDILL [A.] said that Professor Pite had made an assertion which could hardly be designated an argument against registration. It was to his mind fallacious, and he was surprised Professor Pite had introduced it. It was with reference to lowering the standard of architecture by the introduction of a compulsory examination which he stated would be of a corresponding standard to that of the present R.I.B.A. Intermediate. He was quite sure that no student with high aspirations would be trammelled, or cease working when he had passed such an examination; he would pursue his course, carried forward by increased enthusiasm, the inception of which might be traced to the desire of passing this much maligned examination. To others it would be an incentive to advancement in architectural knowledge, which they would never have taken the pains to acquire without such compulsory examination. Was there anyone present who for one moment believed that Professor Pite himself would have been fettered, or allowed his enthusiasm and imagination to have been restrained by an examination? The animation and vigour with which he had urged his cause that evening was sufficient answer; no examination could have shattered his ideals as an architect.

Mr. H. ASCOUGH CHAPMAN [A.] remarked that he felt Mr. Pite (in the position of a Professor in the Royal College of Art) was somewhat on a pedestal in regard to ordinary architectural practice; but if he would descend into the arena among the rest of them his views of the registration question might become modified. He (the speaker) had been a supporter of registration for a number of years, and he thought Professor Pite would pardon his remarking on one passage in his Paper where he had used the words "Registration and a low ideal; freedom and a high ideal"; and that a compulsory examination would not be the starting-point but the goal of a young architect's ambition. He could not agree with Professor Pite on this point, as the present starting-point was practically zero, whilst a compulsory examination would give a much higher plane from which a young architect would commence his professional career, and would ensure that every man entering the profession had received a thorough training in construction and showed some aptitude for architectural design, thereby eliminating undesir-

ables, but in no way limiting a man's ideals or ambitions in architecture.

Mr. T. MONKMAN (President of the York Society) declared that his opinions in favour of registration had been strengthened by what he had heard. They could feel for the artistic standpoint from which Professor Pite spoke, but, on the other hand, they were compelled to look at the matter from the standpoint of the average architect, to whom registration appealed strongly, and the issue ought not to be decided in the interests of those who stood at the head of the profession. No matter how high his ideals may be, the architect had to descend to the level of business, and however he might try to cultivate and uplift art, he was bound to recognise that the commercial side of life entered very largely into his profession. Registration would tend to improve both the architect's social status and ability. He would admit that it would be very difficult to institute an examination into a man's artistic qualities, but his scientific and constructive knowledge ought to be tested, and once they went so far it might be possible to do something with regard to the artistic side. In other professions men were not allowed to practise until they had shown some ability, and it seemed to him that the same argument should hold good of architecture.

Mr. S. KIRSON expressed the opinion that at present architects were not worthy of registration. They did not "hang together," nor were they educated up to registration. If they wanted to keep the enterprising rent collector and superannuated clerk of works out of the profession they must show the public that, as a result of superior education and training, they could do infinitely better work than those gentlemen.

Mr. BUTLER WILSON [F.], *President*, in conveying the Society's thanks to the lecturers, said he did not propose to take a vote on the question, as the Society had already, at a special general meeting, passed a resolution unanimously in favour of the statutory registration of qualified architects if promoted by the Royal Institute. Professor Pite had said that the Societies at Glasgow, Manchester, and Sheffield were by no means unanimous on this question; but he (the President) might say that although the Glasgow Institute had come to no decision in the matter, their president was in favour of registration, provided it was taken up by the Institute. Manchester was strongly registrationist, and Sheffield so much so that, as Professor Pite had told them, they declined to include his Paper in their syllabus. He (the President) had in his possession communications from fourteen out of seventeen Allied Societies stating that they had passed resolutions in favour of registration. He had already expressed his views on this question, and he would not repeat them there if for no other reason than the fact that he had been appointed a member

of a committee of the Institute to consider the question.

Professor Pite and Mr. Seth-Smith having replied, the proceedings terminated.

MINUTES. IX.

At a Special General Meeting held Monday, 29th February 1904, at 8 p.m.—Present: Mr. Aston Webb, R.A., F.S.A., *President*, in the Chair, with 30 Fellows (including 10 members of the Council) and 34 Associates (including 2 members of the Council): the Chairman announced that the Meeting was convened pursuant to By-law for the purpose of electing the Royal Gold Medallist for the current year, and moved in accordance with notice that M. Auguste Choisy [*Hon. Corr. M. Paris*] be elected for the honour. Whereupon it was

RESOLVED, *nem. con.*, that subject to His Majesty's gracious sanction the Royal Gold Medal for the promotion of architecture be awarded this year to M. Auguste Choisy, Inspecteur-Général honoraire des Ponts et Chaussées, Paris.

This concluded the business of the Special Meeting.

At the Ninth General Meeting (Business) of the Session 1903-1904, following the Special Meeting above referred to and similarly constituted, the Minutes of the Meeting held 15th February 1904 [p. 212] were taken as read and signed as correct.

The Hon. Secretary announced the decease of Percival Gordon Smith [F.], and made some sympathetic remarks thereon: whereupon it was resolved to record upon the Minutes of the Meeting the deep regret of the Institute at the loss it had sustained, and that a message of sympathy and condolence be sent from the Institute to his family.

On the motion of the Hon. Secretary a vote of thanks was passed for donations to the Library, and especially to Mr. Sydney Smirke [F.], from whom had been received his fifteenth annual donation of £5 to the Library Fund.

The following candidates for membership were elected by show of hands under By-law 9:—

AS FELLOWS (9).

ARTHUR EDWARD BARTLETT [*Assoc.* 1891].
THOMAS COOPER [*Assoc.* 1892] (Birmingham).
BANISTER FLIGHT FLETCHER [*Assoc.* 1889, *Godwin Bursar* 1893, *Inst. Essay Medallist* 1896].
SIDNEY FRANK HARRIS [*Assoc.* 1893] (Northampton).
ARTHUR KEEN.
CHARLES RICHARD GUY HALL [*Assoc.* 1888].
FRANK MANOAH KENT, Pietermaritzburg, Natal.
HENRY WINTER JOHNSON, Market Harborough.
ALFRED HILL PARKER, Worcester.

AS ASSOCIATES* (22).

HERBERT WILSON ASMAN [*Probationer* 1898, *Student* 1901] (Bradford).
LAWRENCE LEE BRIGHT, *Inst. Medallist Drawings* 1901 [*Probationer* 1895, *Student* 1899] (Nottingham).
MANUEL NUNES CASTELLO [*Probationer* 1899, *Student* 1900].
HORACE WILLIAM CUBITT [*Probationer* 1897, *Student* 1899].

* Except where otherwise stated, all the candidates for Associateship passed the Qualifying Examination last November.

- WILLIAM ROBERT DAVIDGE [Probationer 1898, Student 1900].
 WILLIAM JOHN DELBRIDGE [Probationer 1899, Student 1901].
 GEORGE DYKES, jun. [Probationer 1894, Student 1902] (Glasgow).
 HENRY TUTTY FOWLER [Probationer 1892, Student 1894] (Barrow-in-Furness).
 HAROLD GRIFFITHS [Qualified 1888].
 EDWIN GEORGE HARRY GUNN [Probationer 1899, Student 1901].
 WILLIE HEMINGWAY [Probationer 1898, Student 1900] (Bolton).
 HOLLAND WILLIAM HOBBISS [Probationer 1897, Student 1899].
 FRANK GARFIELD JOHNSON [Probationer 1899, Student 1902] (Newport, Mon.).
 JOHN STEVENS LEE, *Title Prizeman* 1898 [Probationer 1893, Student 1895].
 HENRY BLINMAN MACKENZIE [Probationer 1897, Student 1899] (Cardiff).
 FRANCIS WINTON NEWMAN, *Ashpitel Prizeman* 1903 [Probationer 1895, Student 1897].
 HENRY MELANTHON PRITCHARD [Probationer 1900, Student 1901] (Cardiff).
 THOMAS HENSON ROBINSON [Probationer 1895, Student 1896].
 ANDREW ROLLO, *Inst. Medallist Drawings* 1903 [Probationer 1897, Student 1900] (Glasgow).
 GEORGE LEONARD RUSSELL [Probationer 1897, Student 1899].
 HENRY WALCOTT STONE [Probationer 1900, Student 1901] (Taunton).
 JOSEPH JOHN WOOD [Probationer 1897, Student 1899] (Leeds).

AS HON. CORRESPONDING MEMBER.

GLENN BROWN, Fellow and Secretary of the American Institute of Architects (Washington).

The President, in accordance with notice, moved the following Resolutions on behalf of the Council:—

That the necessary alterations to the By-laws be drafted and submitted to a Special General Meeting to provide that after the 31st December 1906 every person desiring to be admitted a Fellow shall be required to have passed the Examination or Examinations qualifying him as an Associate; but that, in exceptional circumstances, the Council shall have power to dispense with such Examination or Examinations.

Further, that during the intervening period the doors to the Fellowship be opened wider than at present, so that no reputable architect eligible under the Charter for election who desires to join the Institute as a Fellow should be debarred from doing so.

After some discussion it was arranged to take the Resolutions separately, and, as regards the first Resolution, a proposal by Mr. H. Hardwicke Langston [A.], seconded by Professor Beresford Pite [F.], to insert after "Associate" the words "or shall be elected from the ranks of the Associates" was agreed to. Whereupon it was

Resolved, that the necessary alterations to the By-laws be drafted and submitted to a Special General Meeting to provide that after the 31st December 1906 every person desiring to be admitted a Fellow shall be required to have passed the Examination or Examinations qualifying him as an Associate, or shall be elected from the ranks of the Associates; but that, in exceptional circumstances, the Council shall have power to dispense with such Examination or Examinations.

On the second Resolution, an amendment proposed by Mr. J. Douglass Mathews [F.] and seconded by Mr. Hugh Stannus [F.] was agreed to, and the Resolution passed in the following form:—

Further, that during the intervening period every architect eligible under the Charter for election who desires to join the Institute as a Fellow should be encouraged to do so.

The Meeting then passed to the consideration of the following Amendments proposed by the Council to the Institute Paper "Suggestions for the Conduct of Architectural Competitions," viz.:—

Clause 2 (a) to read as follows:

"To draw up the particulars and conditions (as far as possible in accordance with the principles herein set forth) as Instructions to Competitors, and also to advise upon the question of cost and the amount and apportionment of the premium or premiums.

Note.—In drawing up the Instructions to Competitors it is desirable to divide them into two distinct classes:

(i.) *Conditions*—i.e. those which must be strictly adhered to.

(ii.) *Suggestions*—i.e. those which are merely optional or of a suggestive character."

Clause 7: Delete entirely.

Renumber clauses 8, 9, 10, 11 as 7, 8, 9, 10 respectively.

Clause 12: Delete all first paragraph and renumber the second paragraph beginning "It is essential . . ." as clause 11.

Add the following clause as the new clause 12:—

The author of the design placed first by the assessor or assessors should be employed to carry out the work, and he should be paid in accordance with the Schedule of Professional Practice as to the Charges of Architects sanctioned and published by the Royal Institute. If no instructions are given to him to proceed within twelve months from the date of selection, or if the proposed works are abandoned by the promoters, then the selected architect should receive payment for his services in connection with the preparation of the competition drawings of a sum equal to 1½ per cent. on the amount of the estimated expenditure.

Clause 2 (a) as amended was moved by Mr. A. W. S. Cross, M.A. [F.], seconded by Mr. C. E. Hutchinson [A.], and adopted.

A proposal by Professor Beresford Pite [F.] to omit the words "to competitors" in the Note to Clause 2 (a) was agreed to, and the Note thus amended, moved by Mr. Wm. Woodward [A.] and seconded by Mr. E. W. Hudson [A.], was adopted.

The reason for the deletion of Clause 7 and the renumbering of the following Clauses having been explained by the President, the proposed alterations were adopted.

After some discussion on the new Clause 12, its adoption was moved by Mr. A. W. S. Cross, M.A. [F.], seconded by Mr. C. E. Hutchinson [A.], and carried.

Mr. H. Hardwicke Langston [A.], in accordance with notice, put the following question to the Chair:—Is it in the power of the Council to say whether it is the intention of the Registration Committee, in view of the great interest attached to the movement for the statutory qualification of architects, to take a poll of the members of the Institute upon the general principle involved?

The President stated that he was unable at present to reply to the question, as the Committee had not yet held a meeting.

The proceedings then closed and the Meeting separated at 10 p.m.



Stucco, c. First Century A.D., found near the Villa Farnesina, Rome, during the Canalisation of the Tiber in 1879.

PLASTER DECORATION.

By J. D. CRACE [*H.A.*].

Read before the Royal Institute of British Architects, Monday, 14th March 1904.

PROBABLY few of the arts are really older than the plastic, and it is but in the nature of things that the remains should be few when the work was executed in any material extremely friable, and which, when once exposed to the vicissitudes of weather, was readily disintegrated. On the other hand, when hardened by fire, as in pottery, and proof against the action of time and moisture, liable only to fracture, it remains as evidence of the arts of the most remote antiquity.

It is, however, reasonable to suppose that such fictile substances as clay were wrought into form by human hands to human fancies, even before man learned to bake earthen vessels; and we may fairly assume that the child's delight in mud pies is but the survival of an instinct born with the very earliest babies.

During what vast ages did the dwelling-house continue to be built of mud, moulded into bricks for the convenience of building walls, and dried in the sun? It would be contrary to all that we know of man, even in a very barbaric state, to suppose that century after century these mud-walls were left rough and bare, within and without; void of all attempt at ornamentation, where the material itself offered such facilities. But we have to remember that houses so built, of unbaked mud, continued to be the residential form of building for the masses of the population, even during a very high state of civilisation; and we may feel pretty sure that the houses which for generation after generation were built, and were resolved after a time into their original mud, contributing to form the great mounds which mark their ancient sites, were not devoid of some internal finish and ornamentation. Their decorations have necessarily perished with them.

Nevertheless, we can almost assume that, such as they were, they were prototypes of what followed them: that, little by little, types were formed. It takes ages to form types of ornamentation, and they endure for ages. If we try to think back to what the progress may have been, we can see that after the mud-brick walls were formed, the surface must soon have been "rendered" with a coating of the same convenient material, which would, whilst still moist, readily receive any impress. Inevitably it would receive accidentally the imprints of the workman's hand. His rough tools would leave marks at the beginning and end of each stroke, as he laid on or smoothed his layer of mud; and a chance symmetry would lead him to intentional device, impressed by his fingers or traced by the end of a stick.

From such simple beginnings the practice would soon grow—and probably did grow, as independent developments—along the great waterways of the old world.

Meanwhile, nobler and more permanent forms of building had been found possible by those who could command the combined efforts of the many; and stone took the place of the humbler material for the greater edifices required for defence, for worship, or for sovereignty. The use of stone led to the demand for some material which would adhere to stone, and give a uniform surface; and this was found in simple compositions, having burnt lime as the binding ingredient.

As mortar, or as plaster, such compositions must have been in continuous use; and it is more than likely that many a mud-built house had its inner walls coated with a lime-plaster which, whilst as easy to work as the mud or clay, and as easily impressible, set to a fine and hard surface, and admitted of the added joy of colour. But this also would perish with the mud walls.

Plaster, in the form of a very fine, smooth coating of what we should call lime-putty, was used to give a finished surface to the stone walls or columns of the temples and tombs of Egypt in very early times; but does not seem to have been much used plastically for ornamentation. It was similarly used by the Greeks; and the evidence of its use decoratively by them is mainly inferential. It does seem to me reasonable to infer that as they certainly used the material, and as certainly used moulded terra-cotta ornamentally in their buildings, they probably did make some use of moulded stucco for ornamental details before they had acquired the art of sculpture.

This appears all the more probable because, by tradition, their sculptured ornament was always to be found in such protected positions as might suit a material liable to injury, as, for instance, in the metopes and friezes; and modelling must have been long and habitually practised before it was thought worth while to bake the results; and perhaps before the tools existed which could make sculpture in hard stone possible.

But there is another reason for inferring that stucco may well have been used decoratively in an early period of Greek history. It was in use to great perfection, at no great distance, and at a period long antecedent to anything hitherto known of Greek art.

Two or three years ago we all supposed that until the rapid perfection of Greek art, between the sixth and fourth centuries before Christ, the strictly conventionalised art of Egypt, and perhaps of Assyria, represented the only advance of art to any worthy position. Then came the excavations at "Knossos," in Crete, by Mr. Arthur Evans, and our whole notions on the history of art have to undergo a change. Among the many wonderful revelations of those excavations none are much more surprising than the stucco decorations in relief with which some of the walls had been decorated. A valuable opportunity of examining the reproductions of these and other treasures from the same site was given in the winter exhibition of the Royal Academy a year ago. And it was only in December, 1902, that Dr. Evans gave this Institute a very full description of the results of his work, many of the illustrations to which were

given in your JOURNAL.* I will therefore remind you that among those illustrations are some showing fragments of a plaster ceiling ornamented with a repetition pattern of connected spirals in relief, decorated in colour; and that the collection shown at the Royal Academy included the casts from a bull's head almost worthy of the Parthenon frieze; and of the torso of a man, nearly life-size, exhibiting a remarkable artistic knowledge and vigorous power. Both these were parts of the stucco decorations of the walls, and were in low relief and coloured.

According to the best authorities, the palace of which these were decorations was destroyed in the fifteenth century before Christ—a thousand years before Greek art emerged from a lifeless archaism.

There is surely something almost appalling in these evidences of the triumphs of man in art, knowledge, and civilisation, at epochs remote, and then again remote—always to be followed by vast submerging waves of decadence, destruction, oblivion, silence. But if we possess little trace of the early use by the Greeks of decorative plaster work, we know their skill in modelling during all their best periods, and we fortunately possess examples of what their successors could do after the Roman conquest of Greece.

Beautiful specimens of decorative stucco work have from time to time been unearthed in excavating the ancient sites of Rome and the surrounding country. The Baths of Titus, when discovered at the beginning of the sixteenth century, proved a mine of decorative art; and, as we shall see later, the delicately modelled stuccos, no less than the painted ornaments, became the admired exemplars for the great masters of decorative art at the very time when Renaissance art reached its highest perfection. Since that time what hidden treasures have been brought to light! Herculaneum and Pompeii, from the fact of their being suddenly buried as they stood, have given us details which could never have survived a more protracted decay; whilst the number of isolated discoveries has been considerable, as in a tomb at Cervetri, where the relief decorations are partly cut in the tufa, and partly formed in stucco.

When in Rome, in the spring of 1859, I saw two sepulchral chambers on the Via Latina, which had been discovered a few months before. Their vaulted ceilings [fig. 1] were elegantly ornamented with stucco in low relief, panelled with mouldings and medallions, all executed with a delightful freedom and delicacy. Within the medallions, figures of children or animals, modelled *in situ*; the relief slight, the touch free, the design completed or expressed here and there by an outline indented in the ground. A few simple colours were used between the mouldings to express the division of the surface. The date of the structure is about A.D. 160, as indicated by the *signa tegularia* on the bricks.

Within the last few years also have been found, in the Farnesina grounds, the buried remains of buildings ornamented with stucco reliefs of an elegance and a refinement of execution quite unsurpassable [see headpiece]. One great value of these works is the lesson they teach in the adjustment of the actual treatment in execution to the nature of the material. The whole surface speaks aloud of the ready and dexterous use of fingers and tools on a light plastic material. It is most instructive to compare the treatment of the carvings in stone or marble found in the same excavations. In these the execution is firm and crisp, the design relieved here and there by strong shadows; whereas, in the plaster ornament, there are no strong shadows, only enough—barely enough—to express the design. One almost imagines the stucco yet moist, still impressible to the touch. It is as if some fairy goddess had found it soft, and lightly fingered it. There is a sense of evanescence about it, whilst the charm of perfect attainment remains.

Let us now turn for a time to a very beautiful but very different growth of plaster

* 20th December 1902, No. 4, Vol. X.

decoration—that which was developed under the Mohammedan conquerors. In the last quarter of the ninth century of our era was erected the great Mosque of Ibn Tooloon at Cairo. Its brick walls were entirely coated with plaster, and on the same material were executed all its

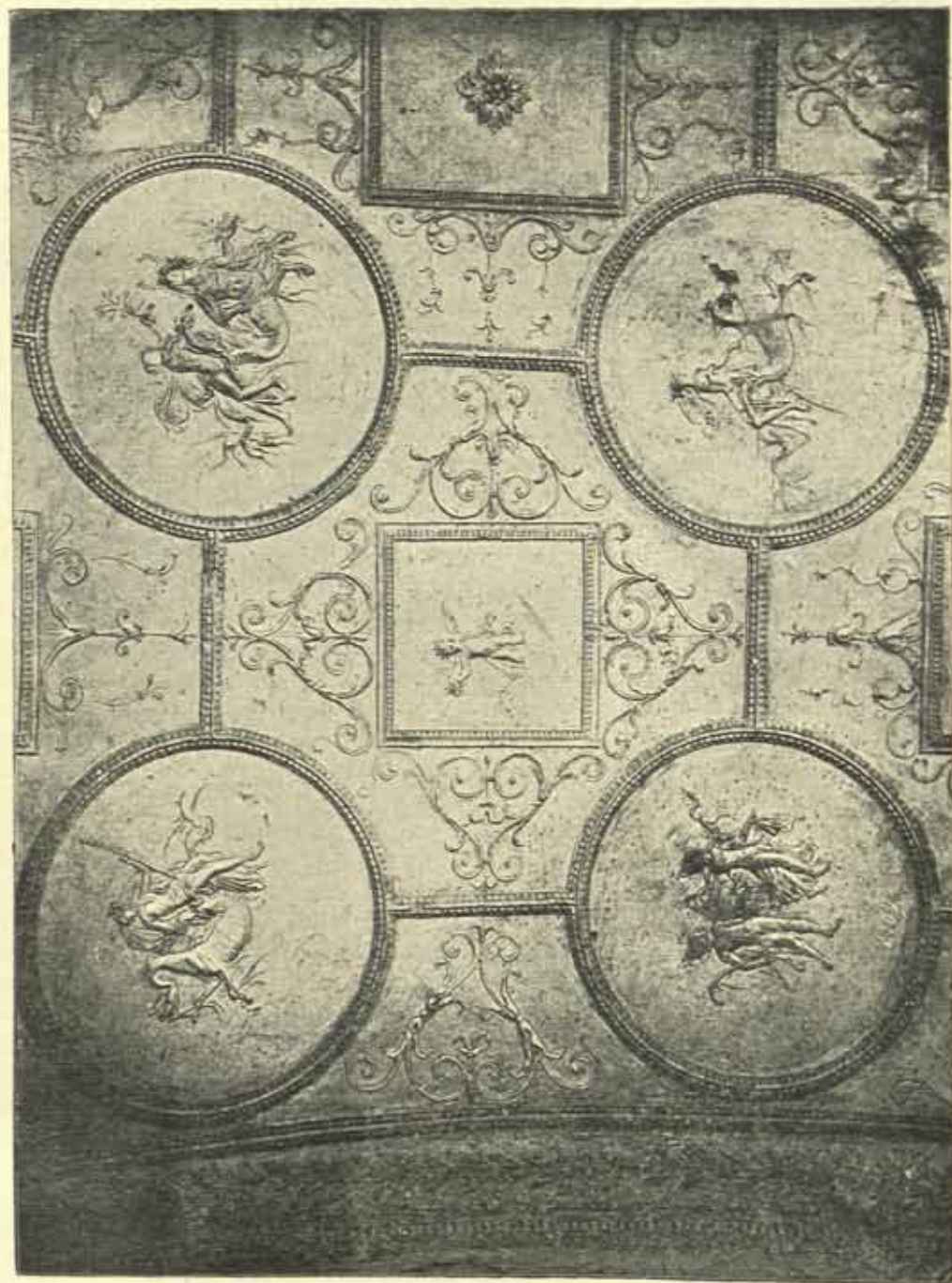


FIG. 1.—CHILING DECORATION, LOW RELIEF IN STUCCO. FROM THE PAINTED TOMBS ON THE VIA LATINA, ROME.

beautiful decorations [fig. 2]. These are repetition castings, and take the form of bands, or borders, of admirably designed conventional ornament, which frame the pointed arches and are continued as "imposts" connecting them. Others are used as friezes above the arches; the wooden plate which carries the roof being carved with inscriptions in Kufic character and forming a cornice. Long exposure to the weather seems to have destroyed all trace of the colour and gilding with which it was doubtless illuminated; but it remains a very valuable early example of a refined and dignified use of simple means. Even the capitals of the angle shafts of the piers are cut or cast in plaster.

Another building, erected about a century later, but in a very ruinous state, the Mosque of El Hakim, still retains some remains of its external plaster decorations, as well as of the friezes of Kufic inscriptions, worked in plaster, which ornamented its interior walls.

Without pursuing the subject through all its periods in the Arabic art of Egypt, it should be mentioned that plaster continued to be used there as an important factor in decoration, both external and internal, throughout the developments of its architecture during the next five centuries. The ornamentation of the domes, both inside and outside, is not a little remarkable. The use of a fine stucco, or gesso, in low relief ornament, as a preparation for gilding and colour on the wooden beams of its flat roofs, should also be noticed.

But of a wider celebrity, and more easy of access to us, is that wonderful footprint of the Moor in Spain—the palace of the Alhambra. Here is the very apotheosis of plaster: of plaster casting, carried, perhaps, to an excess of richness and elaboration, but never losing its true quality of ornament designed purposely for casting.

As more or less elaboration is intended, the ornament is designed in one, two, or three strata. That which projects most is the simplest, the leading motive, and the *encadrement* of

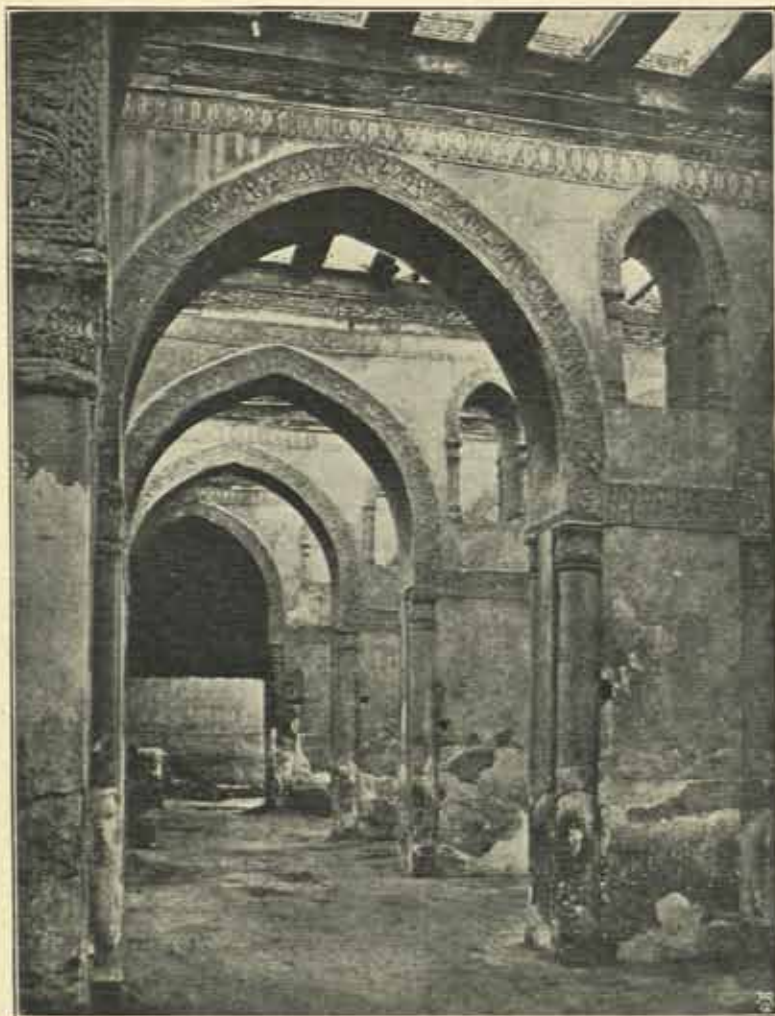


FIG. 2.—MOSQUE OF IBN TULOON, CAIRO.

the more complex ornament of the next stratum. The latter, often enriched on the surface, winds in and out of this bolder form, filling the intervals, but never disturbing its outline. With all its elaboration it will "draw from the mould" at one operation. Surely, there is something to be learnt here. It is not necessary to follow Moresque design in order to pursue a legitimate principle, but it is evident that very beautiful effects are possible with very simple means, and with a very simple material. The important thing is to understand *why* so much can be attained by a mere repeat casting. I think it is mainly because (1) the designers thoroughly understood grace of line and how to fill their spaces. (2) They never lost sight of the fact that the work was to be cast. (3) Most important of all, the repetition did not include the representation of natural objects, for it is where representations of nature are concerned that repetition is offensive.

As you know, this plaster-work was made glorious with colour. The other wonderful details and accessories of the building show how little economy had here to do with the use of plaster. In more truly European art we get little glimpse of the decorative use of stucco during the mediæval times until the fifteenth century, when it became important. A very original and striking example, belonging to the middle of that century, is to be seen in the drum of the dome of San Eustorgio at Milan. This space is occupied by a series of twenty standing angels in high relief, varied in attitude, and supporting a cord, from which are suspended curious bell-shaped bouquets of flowers and foliage; the whole placed against a flat arcading. Above and below these are flatly moulded cornices, whilst the wall lunettes are framed by bands of low relief ornament and a frieze of cherubs' heads. This is the work of that able sculptor-architect, Michelozzo Michelozzi, of Florence, and is said to have been executed in 1462.*

In the second half of the fifteenth century we find Bernardino Pinturicchio making considerable use of low relief enrichments, not only for the mouldings with which he divided the surfaces which he had to decorate, but as ornamental features within the paintings themselves, a practice much condemned by Vasari, as making the things which should be subordinate the most prominent. Those, however, who have seen his works in the "Appartamenti Borgia" of the Vatican,† and in the famous "Libreria" at Siena, must allow that, from the decorative point of view, Pinturicchio knew what he was about. In what material these relief enrichments were executed, I am not sure; it certainly admitted of being prepared in moulds and affixed to the work; and, when I last visited Siena, I was interested to observe that the band of richly-coloured interlaced ornament, which divides the ceiling vaulting in the last-named work, had in one place become detached, and that the relief ornament was, in that case, mounted upon a thin ground of linen or paper, which had been bent to the shape and so affixed to the plaster vaulting.

Within a few years after this, Bramante was at work on St. Peter's; and, in summing up his life and his services to architecture, Vasari says that "His continual investigations frequently resulted in the discovery of some useful invention whereby the art was largely enriched. Among other instances of this was the method of vaulting with gypsum and that of preparing stucco, both known to the ancients, but the secret of which was lost in their ruin, and had remained concealed even to the time of this master" (II. 442). Elsewhere he mentions that the stucco Bramante used at St. Peter's was "of limestone and puzzolana."

* An excellent coloured model of this dome, made by Consolani, to a scale of $\frac{1}{10}$, is in the South Kensington Museum.

† In speaking of the stucco ornaments in the Borgia apartments of Bernardino Pinturicchio, Vasari also says: "But the methods now practised in stucco were not known at that time, and the above-mentioned ornaments are for

the most part ruined." This must have been a somewhat exaggerated statement. At any rate, they have been very efficiently repaired, and can be judged of to-day. A very beautiful model of one of these apartments, to a scale of $\frac{1}{10}$, is in the South Kensington Museum, and that of another, in the Museum at Edinburgh.

A very complete account of the source from whence were derived the delicate stucco decorations in the Vatican Loggie and the Villa Madama is to be found in Vasari (V. 19), who narrates how Raffaello and Giovanni da Udine went together to see some subterranean chambers then just discovered in excavating the Baths of Titus. "These were covered all over with minute grottesche, small figures, stories and ornaments executed in stucco of very low relief. With these minute ornaments in stucco were mingled portions in colour of the most varied beauty." Both Raffaello and Giovanni "were seized with astonishment at the freshness, beauty, and excellent manner of these works," and so much was Giovanni impressed by them "that he devoted himself wholly to the study thereof," and reproduced them "with so much grace and facility, that nothing more was now wanting to him than the knowledge of the manner in which the stucco was compounded."

"Many before his time had," says Vasari, "used a composition made of gypsum, chalk, Greek pitch, wax, and pounded bricks, which they had then gilded with gold.* But they had not succeeded in discovering the true method of making stucco similar to that used on the works discovered in the ancient grottoes and chambers." That which was being used in St. Peter's was, he says, "of limestone and puzzolana" in moulds of clay; but with this he could not obtain the delicacy and fineness of the antique, nor the whiteness of colour. He therefore first tried pounded travertine instead of the puzzolana, but found this gave "rather a livid than a pure white." Finally he compounded finely powdered white marble with the lime from white travertine, "and found that he had thus indubitably succeeded in producing the stucco of the ancients, with all the properties that were to be desired therein."† He showed the results to Raffaello, "who at once caused Giovanni to decorate all the vaultings of the Papal Loggie with the most beautiful ornaments in stucco. The whole work was executed in mezzo and basso-relievo, the decorations being varied by stories, landscapes, foliage and other fancies." He goes on to say that "these works of Giovanni, for the beauty of their design, for the richness of invention displayed in the figures, and for the colouring, whether in stucco or painting, are indeed to be preferred to the ancients"; and he proceeds to expatiate on the truth and charm of the painted details from natural objects which Giovanni represented there; and the same treatment was adopted in the decorations of the Villa Madama.

Mrs. Merrifield quotes from the "Marciana Manuscript" (in the Library at Venice) the actual recipe for this stucco, as given by a sculptor, Jacopo Tatti (di Monte S. Savino), who had tried it. He had been at Florence with Giovanni da Udine, and had also been at Rome under Julius II. The proportions were: "finely powdered travertine 5lbs., and if you would have it finer and more delicate, take fine marble instead of travertine, and 2lbs. of slaked lime. Mix them together with water, and beat them well together like a fine paste, and execute what works you please with it, either by forming it with your hands, or in moulds, and dry it in the shade." The writer proceeds with instructions for making it white by using fine powder of white lead and lime on the damp surface; but this was probably only required when the travertine was used. We have here therefore extremely detailed information as to the material employed on two of the most famous and important works of the period of the zenith of Italian art.

But Giovanni was by no means the only—nor even the chief—stucco worker among that wonderful band of young artists in the Vatican. If his delicate skill was paramount in the

* The composition here given by Vasari seems incongruous. I suggest as possible that the Greek pitch and wax were used for the moulds; while the gypsum, chalk, and pounded bricks were the ingredients of the stucco.

† Probably guided by some reference to Pliny or Vitruvius. The work of the latter had then been recently printed for the first time.

beautiful little medallions in which he emulated the ancients, to his fellow-worker, Pierino del Vaga, must be assigned even a higher place. Of all the artists in that wonderful group, Piero was the one whose work, whether in relief or in colour, shows him to have had the finest decorative perceptions. As an ornamentist, and as a decorative colourist, he stands pre-



FIG. 5.—CEILING OF THE SALA REGIA, VATICAN.

eminent, and his stucco-work has a quality of fine decorative appropriateness, both in design and scale, that has been surpassed by none. Of his bolder conceptions the great ceiling of the Sala Regia is a fine example [fig. 3]. It is of this work in stucco that Vasari exclaims, "of a truth it may justly be affirmed to have surpassed all that has ever been done in that manner by the ancients or moderns." Of work on a smaller scale he executed much in the Vatican Loggie and elsewhere. His decoration of the little Loggia of the Doria Palace at Genoa I look upon as one of the most perfect decorative works in all Italy. "He was beloved by Raffaele as a son," says the old chronicler.

The use of stucco decorations increased during the sixteenth century, not only in

Italy but throughout all those States to which her influence extended; but, before quitting Italy, one or two of the artists who became famous for its use in the later half of that century should be mentioned. Of these Alessandro Vittoria is one of the best known, and his work under Sansovino at Venice, in the Libreria (lately damaged by the fall of the great Campanile), and in the "Scala d' Oro" of the Ducal Palace, said to have been completed in 1577, are characteristic examples of his style. There are, of course, hundreds

of examples by less known men, or by artists now unknown, scattered through all the cities of Italy.

There is one of a high order, of which I have never seen mention, in the church of Sta. Maria delle Grazie at Milan. The lower wall of the fifth chapel to the right, on entering the church, is decorated in low relief with the figures of four angels, about six feet high, supporting garlands or festoons of flowers and foliage—the whole surmounted by a frieze and cornice, above which are the fresco decorations. This is a very graceful and beautiful work attributed by the local custodian to Vincenzo Vicentino, the gem engraver, of the latter part of the sixteenth century, but on what authority I am not aware.

But it was some forty years or more before the completion of these last-named works that Francis I. had attracted to France some of the most capable of the Italian artists who were skilled in stucco. Of these Primaticcio and Il Rosso came to France about 1530, and, whilst producing the wonderful stucco decorations of Fontainebleau [fig. 4], influenced French design and French sculpture for many a day. They were followed, twenty years later, by Niccolò dell' Abbate, to whom came also his three sons, the youngest becoming, after a time, the director or manager of these decorative works. Certainly it would be impossible to make



FIG. 4.—SOME OF PRIMATICCIO'S WORK, GALLERY OF FRANÇOIS I., FONTAINEBLEAU.

plastic art of a high order take a larger share in interior decoration. But I must own, though with much admiration for the art and grace of the separate parts, that the whole is overcharged, one may almost say overstocked, with those graceful, long-limbed figures. Their very number produces a sense of superfluity, and encumbers the judgment. But for the study of what may be done in stucco it is a fine field for the student; and it was the parent of the rich decorations of Louis XIV.'s reign, which, in their turn, became the model for civilised Europe [fig. 5].

But, at the same time when the French king, Francis, was so actively encouraging Italian artists to bring their talents to his Court, our own Henry VIII., his rival, had similar

ambitions, and was zealous to secure the services of able artists. In this he was very successful, many of those who came over being pupils or relations of those who were at work



FIG. 5.—"GALERIE D'APOLLON," THE LOUVRE.

on the masterpieces of the Vatican, members of that famous band who had Raffaele as leader. Pietro Torrigiano was among the earliest. He completed the bronze monument to Henry VII. in 1519, and had died in Spain, a victim to the Inquisition, in 1522. It was to the Palace of Nonsuch, begun in 1538, that the new stream of talent was directed, and

although not a vestige of it now remains, the names of some of the men who adorned it are a guarantee that the work within and without was neither coarse nor commonplace,* and that the figures with which the stucco "histories" were peopled were far more graceful and refined in design than any which had previously been executed in England for decorative purposes. I am at a loss to understand why any question has been raised lately about their external panels having been worked in stucco. There is not really the smallest doubt on the subject. Not only did King Henry send for artists who could work in stucco, but John Evelyn, who was well trained to observe, who had travelled and studied in Italy, and knew the works done there, expressly states the fact. As to the improbability that such work would be done in plaster and left exposed, why, there are plenty of examples done more roughly, and within the next seventy or eighty years, which remain to this day, in spite of exposure and often neglect.

External decorative work in plaster continued to be a feature of many English houses, both in town and country, till the close of the seventeenth century. But it was, of course, the interior which was the more important field for such decorations, and from the time of Nonsuch onwards, through the hundred years following, no house of any pretence was without its elaborate plaster ceiling and frieze; and though many have perished—too often by fire—there can hardly be a county in England which cannot still show examples of fine panelled ceilings and chimney fronts, or of those ornamented with the scroll "strapwork" which was an English development. Many good examples exist in Scotland also.

I shall not dwell on the work of this period now, because it has been more fully studied and illustrated than any other. It came to an end in the reign of Charles I. Undoubtedly the English plaster work of that time was admirably suited for domestic work, and affords most useful suggestions.† I venture to offer, however, one or two criticisms as to its use. In the first place, to take as a model such a panelled ceiling of a moderately sized room, and to adapt it for a big room or hall by magnifying all its parts, appears to me to be a serious blunder. The work was never very refined in execution, and to magnify it is to make it coarse. Again, to mistake its defects for beauties is to lower the whole standard of art execution. But the other day I heard the wavy unevenness of surface and the broken line of mouldings spoken of as a valuable part of the excellence of these ceilings, with a lament that we did not so work now. This is a very spurious form of admiration. A broken or bulging wall is more "picturesque" than one built straight and plumb; but no one wants to build a wall bulging or broken on that account.

The fact is that, admirable in many ways as these old English ceilings are, few of the men who did them had either the art or the skill of the Italians who made ornamental plaster work popular. These latter endeavoured to make their work perfect in modelling and in finish. The figures introduced were true works of art. But in the English plaster-work of the time you can hardly find a figure that is not more or less barbaric in execution, and the minor ornament, effective as it is, is often greatly wanting in grace of line and in intelligent modelling. These things are defects; and while much charm remains, do not let us mistake the defects for the charms, and imitate imperfections which the original worker would gladly have avoided. Such Chinese conservatism is a dry-rot to any art.

Our next step in English plaster-work is one which leaves behind all trace of the

* "I much admired how it had lasted so well and intire since the time of Hen. VIII. exposed as they are to the air; and pitty it is they are not taken out and preserv'd in some drie place; a gallerie would become them." Evelyn's Mem.: 3 Jan. 1666.)

† I may mention that two complete rooms, with the original ceilings and oak panelling, have now been fitted up in the South Kensington Museum.

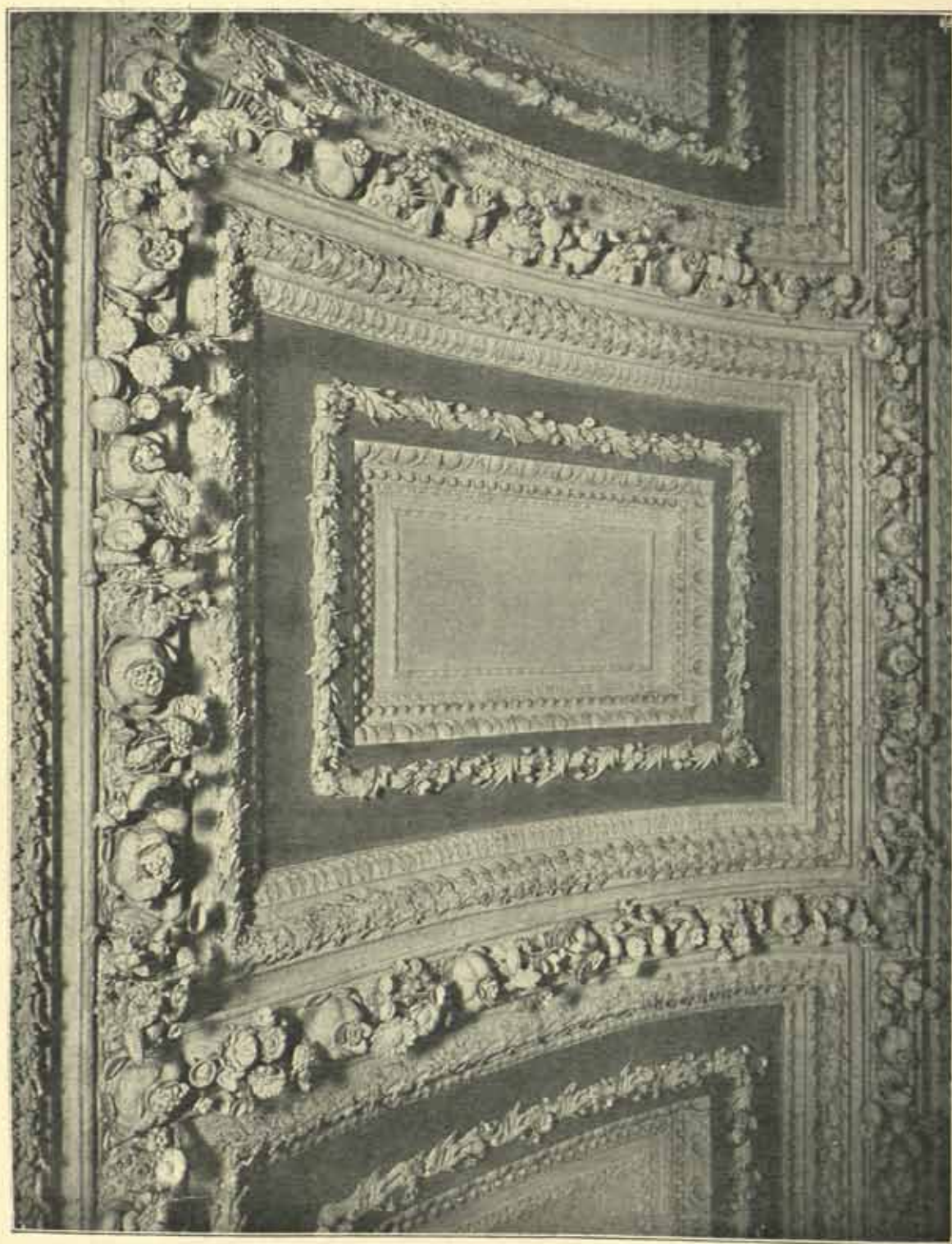


FIG. 6.—DETAILS OF COVE, ROYAL HOSPITAL CHAPEL, HILMANHAM (1684).

remaining Gothic influences, and takes us straight to the classic work of Jones and Wren. The gap caused by the Civil War made the change more complete; and the great building operations in London, after the Fire, opened the way to new men and new methods. Again were French and Italian plaster-workers invited to England in Charles II.'s reign, and

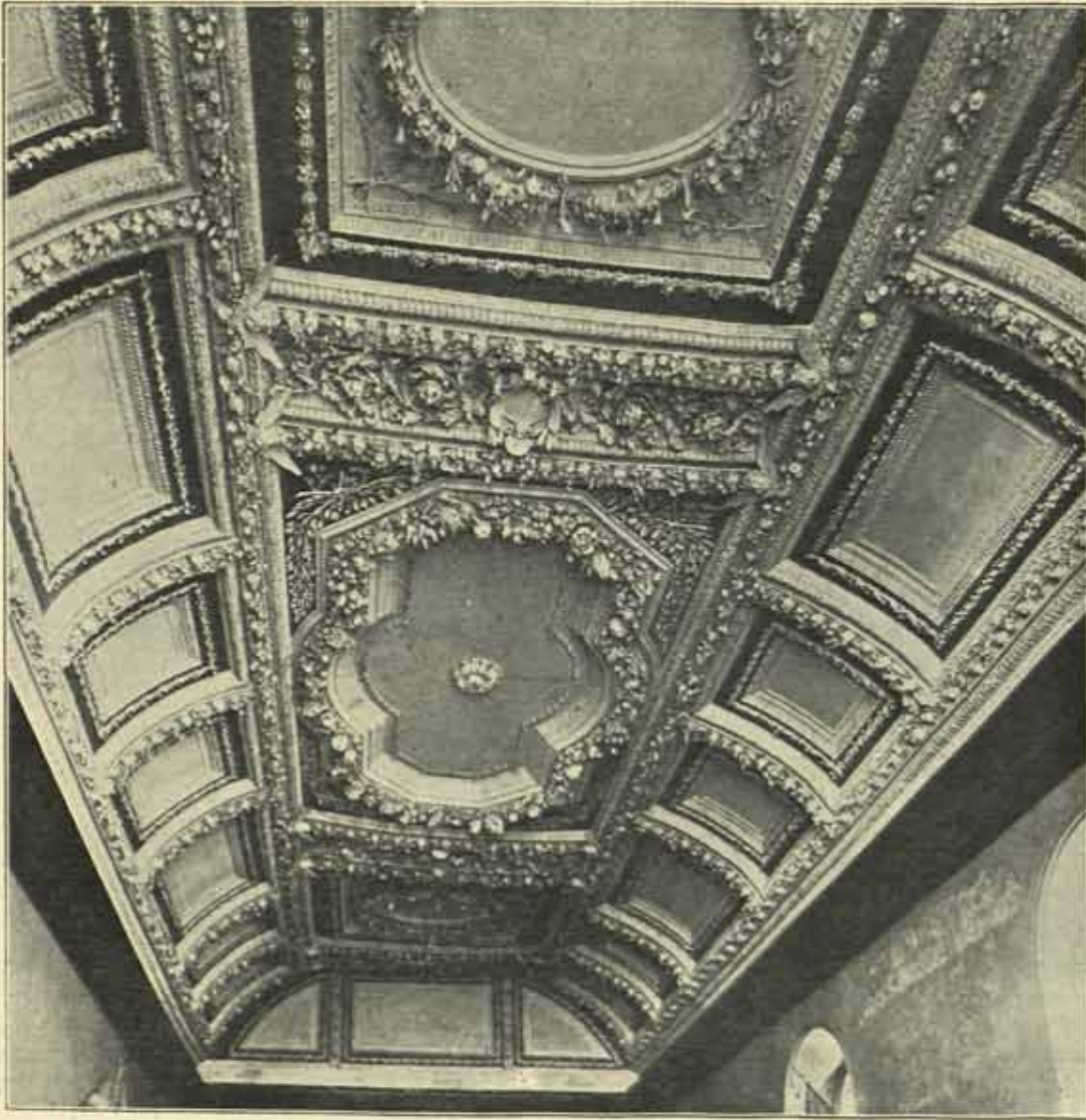


FIG. 7.—PLASTER CEILING, ROYAL HOSPITAL CHAPEL, KILMAINHAM, DUBLIN (1684).

examples of their work, or work done under their influence, may be found scattered through the country. Besides the work in St. Paul's, St. Stephen's Walbrook, and other City churches, the Chapel of Trinity College, Oxford, may be cited as a good typical specimen of the plaster ornamentation, as it is also a more than usually fine one of the woodwork of that time.

One feature, to be found in some of the plaster decoration executed towards the end of the seventeenth century, is the elaborate modelling of fruit, flowers, and foliage in full relief,

often in parts quite detached from the grounds, and supported either by wires embedded in the plaster or by small sticks of tough wood. I call to mind good examples at Euston Hall, in Norfolk, and at Barrington Hall in Oxfordshire, besides many in smaller houses; but the most important and characteristic is perhaps that in the chapel of the Royal Hospital at Kilmainham, built in 1680, of which, by the courtesy of Messrs. Jackson, who have lately renewed it, I am able to show a good illustration and a portion of the original work [figs. 6 and 7]. In this the smaller flowers were attached by means of the long thorns of the blackthorn, which have been used also in the new work. But this work, full as it is of artistic ingenuity and clever modelling, was, by that very ingenuity, departing from any true principles of stucco work, and therefore hastening the decay of the art.

The well-known ceiling of the Chapel (of King Charles the Martyr) at Tunbridge Wells (under which I sat for the first five years of my school life) is of much coarser execution, and was executed by Englishmen about 1703.

An excellent example of the Wren school is that in the board-room of the New River Company (1693) [fig. 8]. The foliage of the border panels is perhaps rather heavy for the height of the room—about 12 ft. 6 in.—but it is free and spirited. The alternation of the rose and sunflower rosettes, in the margin, reminds one of the same treatment in St. Paul's (carving of the west door architrave). The small subjects are modelled freely in a very Italian manner.

Another mansion, "Stansted," near Emsworth, built in 1687, but lately destroyed by fire, contained, besides some good carving of the "Grinling Gibbons" type, some fine and unusual plaster decoration. Fortunately the latter to some extent resisted the fire, and has been renewed by Messrs. Jackson under Mr. Reginald Blomfield's direction. The fine frieze of life-size children could still be seen *in situ*, as well as portions of the ornament. It does not seem to be known by whom these were modelled.

The next modification of style was largely due to Kent. In his designs the plaster ornamentation is mainly used as architectural enrichment, bold in treatment—sometimes too bold for the space; but effective in its way. He was an able designer, and many of his ceiling designs are extant. His work may be seen in Burlington House, Kensington Palace, Chiswick House, Houghton, and many country mansions.

Following closely on Kent's work came a flood of plaster ornament derived from the French work of the time (Louis XV.). This was sometimes really good; often straggling and purposeless, yet not without a certain elegance. There are still hundreds of drawing-room ceilings in London, from Lincoln's Inn to Mayfair, ornamented in this style (dating from 1730 to 1750). The best of it was at least partly modelled; but the greater part was cast and fixed. It rarely has either the grace or the finish of the French work of that time; and of Louis XV. ornament one must say, as of the little girl in the rhyme, that "when it was good it was very, very good; but when it was bad it was horrid." With this style practically stucco modelling came to an end. All that followed was cast and fixed. Just as, in France, the staid and somewhat prim style of Louis XVI. succeeded the exuberant treatment of that of his predecessor, so in England, the ornament but now described was succeeded by that which is connected with the name of the brothers Adam.

It is an instructive fact that the change was due to the same influence which had produced the detail of the Vatican Loggia and the Villa Madama, namely, that of the antique stucchi in the excavated ruins of Rome. The difference in the result is perhaps easy to account for: Giovanni da Udine studied them, as an artist, by endeavouring to produce similar work with his own hands. Robert Adam, as a draughtsman, copied them on paper, as did probably the Frenchmen through whom France adopted the style. It was undoubtedly elegant and the effect refined; and, since the method of reproduction was mechanical, it lent itself to

very extensive use. The number of town and country houses built in George III.'s time was enormous; and the examples of this form of plaster decoration proportionately numerous in England, Scotland, and Ireland. They often include very charming medallions, cast from good models, of heads, single figures, or groups, in the "classical" taste; and the arrangement and distribution of the ornament are usually excellent. It has the one defect that the touch of the hand is not upon it. It is too well known, and has been too largely illustrated, to make it necessary to give examples here. The latest of much merit are perhaps to be found in the houses of Portland Place.

I do not think that we need touch on the inconsequent vagaries which the next half century produced; and I turn with a shudder from any mention of the plaster Gothic vaulting and pinnacles of Strawberry Hill and its imitators. Much good plaster work has been done in the last half of the nineteenth century, but it has always been in the form of attempts, sometimes very successful, to reproduce a past style, and by casting. There is, however, one valuable innovation which must be noticed, namely, the introduction and constantly extended use, since 1861, of the "fibrous-plaster" method. For many kinds of plaster decoration it presents immense advantages. It does away with the great danger of enormous overhead weight, and requires so much the less timber structure to carry it; it can be executed quickly, and it dries quickly. These are important, though not the only advantages.

It is by no means so modern an invention as is often assumed. I remember seeing at Genoa, more than forty years ago (in the old Bank of St. George, I think), several large statues, of the sixteenth or seventeenth century, which were constructed of plaster and canvas on wooden framework.

Its modern use in England came about in this wise. A Frenchman, De Sachy, who had tried to work it in France and failed, was under some obligation to our old friend Owen Jones, who acquired an involuntary interest in it. Owen Jones sought my father's advice about it, and he accompanied Owen Jones to Messrs. Jackson, of Rathbone Place, and

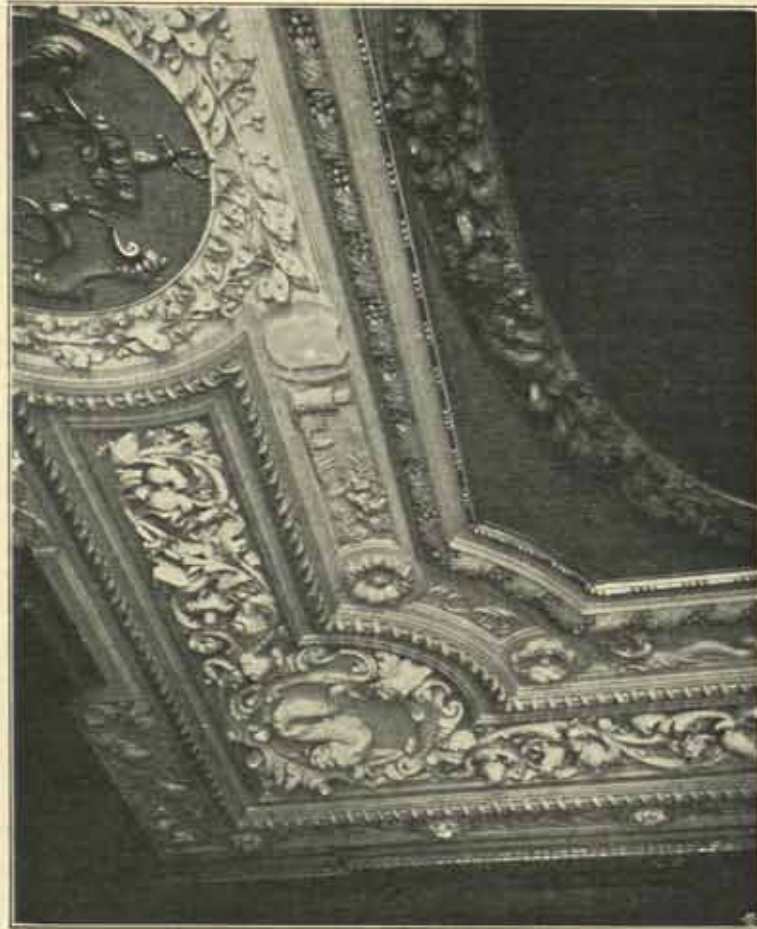


FIG. 8.—CEILING OF THE BOARD ROOM OF THE NEW RIVER COMPANY'S OFFICES (1893).

strongly advised the latter to purchase the patent, which they did. It was not till after considerable practice in its use that they made it commercially successful; but it has now become, perhaps, the most important part of their work.

Ornamental work in plaster or stucco must always continue to be a very valuable means to the internal decoration of our buildings. Its artistic value will vary necessarily with the talent brought to bear upon it. Its facility is at once its recommendation and its danger. But it is perhaps well to be sometimes reminded that the simplest materials have not been scorned by the greatest men, and that the finished result of any art pleases, not only by the talent bestowed on it, but by the fitness of the limitations which the artist has imposed on himself.

I wish to acknowledge my obligation for assistance in the illustration of this Paper: to Messrs. Jackson, for the loan of photographs and examples; to Mr. Millar (deceased since this Paper was written), for his spontaneous offer of examples; to Mr. Mansell, for permission to make slides from his photographs; and to Mr. Searle, Secretary of the New River Company, for enabling me to photograph the ceiling of their interesting room. I am also indebted to the A. A. Camera Club, and to the staff of the Board of Education at South Kensington, for the loan of many excellent slides, some prepared expressly for me; to the latter Institution also for several valuable examples; and I have to thank Mr. Batsford for willing aid, but partially represented by a set of photographs of "Adam" ceilings.

And to those who may wish to pursue further the history of ornamental plaster and stucco-work, I may direct their attention, first, as regards the employment of foreign artists, to a very interesting and informing Paper by the late Sir Digby Wyatt, read at this Institute 18th May 1868, and to an excellent and concise Paper by Mr. G. T. Robinson, read here in 1891. Papers by Mr. Basil Champneys, and others, are to be found also in the JOURNALS of the Institute; and only last December a Paper of a more technical kind was read by Mr. G. P. Bankart before the Architectural Association. The well-known book by Mr. Millar, published in 1897, contains an introductory chapter, by Mr. G. T. Robinson, on the historical side of the subject, whilst the book itself is fairly exhaustive on the technical side, and lavishly illustrated.

J. D. C.

DISCUSSION OF MR. CRACE'S PAPER.

MR. ALFRED DARBYSHIRE, F.S.A., *Vice-President*, in the Chair.

MR. R. PHENÉ SPIERS [F.], F.S.A., in proposing a vote of thanks, said he should like to express his own obligations to Mr. Crace for undertaking to bring this subject before the Institute. Although it had been treated on various other occasions in that room, he felt sure Mr. Crace would treat it in a new way, and bring to their knowledge new facts and new data, and also give a general historical survey which would be a valuable supplement to what had been done before. He was glad Mr. Crace had referred to mistakes made in some of the modern work, where the authors seemed to imitate defects, and looked upon them as beauties because they leaned to the picturesque. In one or two papers read before the Association, that appeared to be emphasised as a desirable attainment. Mr. Crace might have commended plaster work even more than he had done when he referred to those early crude brick walls as having probably received a coating of stucco—probably decorated. As a matter of fact it was to the plaster that the crude brick walls of antiquity owed their preservation. Even now, amongst the

ruins of Mesopotamia, in buildings dating back perhaps from 3,000 to 3,500 years B.C., were found walls covered with stucco, which owed their preservation in great measure to that material. In those days the walls as a rule were painted; he did not know whether sculpture decoration had been found or not. Mr. Crace had referred to Dr. Evans's paper on Knossos, carrying them back to something like eighteen centuries before Christ. The slides shown of plaster figures discovered there—one of a bull's head, another showing part of a human figure of extraordinary power in modelling—revealed a refinement of which they had had hitherto no conception. A large number of decorative details in stucco were also employed throughout the palace; it was in fact the chief means used for decorating the interior. In the representations of the capitals of the columns which were shown, on what was known as the Temple Fresco, he had been told that there was only one way in which they could have been formed, and that was by stucco mouldings round them. Some of the most interesting examples Mr. Crace had shown

were from Rome, and these might be greatly extended, because the series of buildings found in the Baths of Titus, in the various tombs in Rome, and in the villa of Hadrian at Tivoli, were of extraordinary beauty. He had recognised, in a book lately published, one or two ceilings he had himself sketched in earlier days but had forgotten where they came from; and in looking over them again it occurred to him that the work was infinitely more beautiful when on a curved surface or on a vault. Adam copied all the ceilings he came across in Rome and at Tivoli, but his reproductions had always been on flat ceilings; and they never produced the effect that they did on the vaults in Rome. Looking at these flat ceilings, he always felt that there was a tendency to sag. He could not help thinking the effect would have been much finer in the English ceilings if there had been a slightly curved surface. Even in the Adam series one occasionally found segmental ceilings; but we seemed to have given them up entirely. He had himself once or twice been able to do it on semi-domes, and the decoration at once lent itself to the expanse of the vault. In showing them the series of beautiful friezes with Mohammedan decoration, Mr. Crace had said it was eminently plaster-like in its treatment of the design of the figures in that material. As a curious illustration of that, the most successful court in the Crystal Palace was the Alhambra Court, done by Owen Jones; it was the closest resemblance ever made. To form the vault there only eight moulds, he believed, were required, and Owen Jones had reproduced that extraordinary ceiling with consummate skill. It was this keeping the material to its proper use which made the Alhambra the beautiful structure it was. Mr. Crace had shown a figure of that famous work of Michelozzi's at San Eustorgio, Milan, and it might be interesting to members to know that it was deemed so beautiful that they had had a small model made of it at South Kensington. Anyone going to the square room there would see the effect of these beautiful figures. They were meant to be seen from the floor, and were more beautiful when seen from below. There had lately been published in the *Burlington Magazine* a very fine bronze recently discovered behind a picture in the Wallace Collection. It probably dated from the sixteenth century, and was the same sort of figure that Michelozzi had employed in his figures in the frieze above referred to. There was a very fine ceiling at the top of the staircase in the Dolphin Hotel at Southampton, which was quite worth going to see when in that town. They had of course a great affection for Robert Chambers and his work. There were some magnificent ceilings in Somerset House. Being anxious to see the rooms that were occupied by the Royal Academy from 1780 to 1838, he got permission to go

over them; and to his delight he found the ceilings almost intact. They were extremely interesting because they were decorated by many of the members of the Academy, and were all set out and designed by Robert Chambers. He was sure they were extremely obliged to Mr. Crace for the great trouble he had taken—he had had to ransack the records of so many countries to get his views; and he could not have done better than give such an interesting and comprehensive *résumé*, so that they might see what the value of plaster had been in ancient times, and the extraordinary advantage it suggested for future use. Of late the industry had been taken into account again, and at the Art Workers' Guild they had had one or two demonstrations when artists came and modelled the ceilings before the students. That sort of work should be encouraged. He felt certain there was a way open for a new development of plaster, and he hoped Mr. Crace's paper would turn the attention of the public to it, so that it would be employed in future.

Mr. G. H. FELLOWES PRYNNE [F.], in seconding the vote of thanks, said the subject brought before them by Mr. Crace was intensely interesting. They who lived in England must be excused for thinking that they could not use this plaster and stucco work externally with much advantage. With our variable and damp climate, we find over and over again that cement, however well prepared it be, will flake off. The examples of exterior stucco or plaster work during the Victorian era had not been very encouraging. For that reason he supposed it had not been studied as a material to be used externally with much success in this country. Historically, of course, the very elements of their work told them how wonderfully this material was used in the very earliest days—even in some of the examples of the second century, which Mr. Crace had put before them, one could trace the models of Adam's own designs. They had, however, in the ancient work a simplicity, a grace, and a freedom that even Adam found it difficult to copy. Looking backward indeed, the old examples were almost overwhelming; they made them feel how far they had fallen behind those who had gone before. The examples, however, from the Alhambra and Tunis showed them so clearly what was the right treatment of plaster for internal decoration, that the paper was justified even on that account alone. When one remembered those wonderful ceilings overflowing with hanging fruit and vine, of the later Renaissance period, now so much copied in different designs, one felt that it was not the right treatment. It was beautiful in some ways, but not a design suitable for plaster. The earlier men—as at the Alhambra—seemed to have grasped the very elements of their material in getting their different surfaces; and in that respect we should endeavour to follow them. As regards

fibrous plaster, we were, to some extent, in advance of those who had gone before; for in this material our scope was very wide indeed. In fibrous plaster we were able to bring out in a light way some most beautiful effects: to get perfect modelling on to a very light surface. The heavy figures of the Renaissance period, or of the eighteenth or beginning of the nineteenth century, seemed to overweight a ceiling to a great degree, not only in appearance but constructionally; but with fibrous plaster the character of the construction was so light that there was no danger of this defect. In low relief work there was a large field open to them. Mr. Gerald Moira had put up some panel decoration in the Trocadero which were richly suggestive of what might be done in low relief. With ornament of that character, with figures lightly coloured, with the colours washed over, and not over-decorated, there was a large opening for effective decorations, especially with large spaces, where mural decoration might be employed.

MR. W. AUMONIER, referring to the plaster work in Rome Mr. Crace had spoken of, said he saw it a little while ago, and it struck him as being some of the most beautiful he had ever seen. It showed absolutely the free touch of the hand. He and his companions had studied it very closely, and tried to find out the method of working it. He did not think they came to a conclusion, after all, whether the work was begun by applying plaster to the surface and then adding to it by degrees, and working it in that way. If so, it was wonderful the way it had stuck to its ground, because there it remained perfectly sound, showing no tendency to come away. The wonderful modelling, apparently nearly all with steel tools, especially struck him; the whole work was very beautiful indeed. With regard to the Elizabethan ceilings, which Mr. Crace seemed to think suffered from defective work, he did not quite agree with him. Let them imagine those ceilings with the

mouldings absolutely worked through with the stipple, or, if they were wooden mouldings worked very true indeed, with that moulding put between them they would not look half so well. What made the beauty of those ceilings was that it was all handwork. Both moulding and modelling had been worked by hand; and all was in harmony. He did not mean to say that defects were not a fault; but it was a thousand times better with those defects than if the mouldings had been worked mechanically, and the ornament had been modelled by hand, thus giving a quite different character to each part.

MR. CRACE, in responding, replied to points raised during discussion. With reference to what Mr. Spiers said as to the value of curved surfaces and sections for fine ornament, he quite agreed that a very low relief was always seen to better advantage on a curved surface; the slight play of light and shade took away the hardness of edge, and gave something of the charm of the variable light on the landscape. At the same time they must not run away with the idea that artistic merit was to be caught up by placing it in particular positions, or under particular circumstances. Adam's ornament, excellent and effective as it was, was not to be spoken of in the same breath as the beautiful little low relief he had shown from Rome (fig. 1). The one was a mere mechanical reproduction from the model; the other showed from end to end the touch of the artist's hand. Mr. Fellowes Prynne had spoken of stucco or cement as not being suitable for external use in this climate. He (Mr. Crace) did not know that he was prepared to advocate it; but the question having been raised whether the palace of Nonsuch was ever decorated with plaster panels—he simply wanted to show that the argument that nobody would have been so foolish as to use plaster was a very foolish argument, because so many people had done it, and the work remained to this day.

SMOKY CHIMNEYS.

By HASTWELL GRAYSON, M.A.Cantab. [A.].

Read before the Liverpool Architectural Society, 18th January 1904.

THE art of building had advanced a very long way before our ancestors found chimneys necessary. Even then they were content for a century or so with a flue from the kitchen and one from the hall. Modern ideas of comfort, not to mention the Building By-laws, make it necessary to provide every room in the house with a fireplace. We burn coal which produces a dirtier smoke, with a more disagreeable smell, than wood; we have far more curtains, carpets, and upholstery to be spoiled by a faulty flue, and yet twentieth century science can teach very little about building chimneys. It is indeed patent to everyone that the more costly an edifice and the more valuable the site on which it stands, the more difficulty is there in getting rid of the smoke. Walk down Castle Street and count the "tallboys," and then walk down one of those tiny byways christened by their owners "avenues," that spring up by the dozen in the suburbs, and you will see that in flue construction architects know just as little as jerry-builders. This ignorance is especially exasperating, because a more accurate knowledge of materials and methods of construction has filled up the pitfalls of a previous generation. Improvements in concrete, in lightning conductors, and in damp-courses, are instances; dry-rot is rapidly ceasing to be a bugbear. But no architect can guarantee to build flues that will draw in all weathers and under all circumstances. Lord Bacon commences his delightful essay on "Building" with the sentence: "Houses are built to Live in and not to Looke on; Therefore let Use be preferred before Uniformitie; Except where both may be had. Leave the Goodly Fabrickes of Houses, for Beautie only, to the *Enchanted Pallaces of the Poets*; Who build them with small Cost." But all sufferers will agree that no home is fit to "live in" if the chimneys will not draw. This Paper will only recapitulate well-worn theories, and will not provide a patent medicine to prevent or cure that deadly malady, a down-draught.

The principle of a flue is simple. Smoke consists of warmed air charged with particles of matter, either wholly or partially consumed. The warmth makes it lighter than the atmosphere, and therefore smoke rises by the easiest way, which should be up the flue. The trouble begins when the flue is imperfect, inadequate, or when other forces are at work counterbalancing the natural tendency of the smoke to rise. Failure may show itself in two ways—there may be a

steady down-draught, or the upward draught may be so sluggish that puffs descend occasionally. The first is more usual when the fire is just lighted or nearly out. In either case, the nuisance may be accentuated by wind or the absence of it.

The chief cause of smoky chimneys is the lack of air supply at the base. A cubic foot of fresh air must be provided for every cubic foot of smoke that passes up the chimney. Nature allows considerable elasticity to air, but "abhors a vacuum." The Royal Commission on the Ventilation of Factories, after making experiments, ascertained that an ordinary fire in an ordinary room sent 4,000 cubic feet of smoke up the flue per hour, and that, after hermetically sealing the windows and doors, the same flue drew 3,000 cubic feet per hour. Before seeing this fact quoted I had made some personal observations of the smoke discharged through the chimney-pots above an office building: it seemed to me that the velocity was five feet a second in still weather. As the diameter of the flues was about 7 inches, the volume of smoke discharged would be 4,500 cubic feet per hour, or equal to the capacity of a room 15 feet broad, 25 feet long, and 12 feet high. I do not believe that in a substantial building 3,000 cubic feet of air per hour could be produced with windows and doors hermetically sealed, unless the air came down one half of the chimney and the smoke went up the other half. It is well known that buildings with thick walls and fireproof floors, such as blocks of flats or offices, are most liable to down-draught. These blocks have great numbers of fires lighted daily. They have very few outside doors, and a special effort is made in them to keep the windows and internal doors draught proof. In a comparatively small office building, with the only entrance protected by heavy swing doors, there may be 30 or 40 grates in constant use, every one of which should have its 4,000 cubic feet of air per hour. This supply is impossible unless special means are adopted to provide it. In an airtight building time is often the architect's ally; for every minute settlement and every infinitesimal shrinkage provides an additional air inlet. But buildings specially constructed should have special ventilation. Even then some flues will smoke, because tenants persist in closing up the inlets. Warmed fresh air is almost unprocurable; of all the warm-air stoves in the market I do not think that one can produce 25 per cent. of the air which it consumes, and most of them dry

the air too much and warm it in an inaccessible chamber. Anything in the nature of a plenum system is costly to maintain, and even more costly to instal. - Architects, therefore, can only supply fresh air from the outside, and trust that the tenants will use the inlets. But tenants, more often than not, consider fresh air a draught and ventilators an unnecessary fad. Air inlets are least objectionable when near the ceiling, as that position allows the fresh air partially to lose its chill before reaching the occupants of the room; high inlets are also useful as outlets, when the fire is not lighted. The best form seems to me to be a "hit-and-miss" grating (very neat ones can be obtained now, made of aluminium) at the side of a chimney breast into a flue that finishes just above the roof, with cast-iron gratings on opposite sides. I have several times seen air inlets brought close to the grate—in one case the air was led into a copper curb perforated at intervals; the arrangement was ingenious, but in practice was not a success, as the air whistled out and blew the ashes about the room. Inlets direct through the wall, on the old Sherringham principle, are generally inconvenient, unless the room has two outside walls; otherwise the best lighted and most valuable space becomes the most draughty. Fanlights and ventilators through internal walls are more likely to be used. A contractor who has built many offices once advised me to have doors very close fitting at the floor, but very easy at the top, and with the rebate of the frame cut well back. By doing this a concealed inlet can be provided 3 feet long by $\frac{1}{2}$ inch deep, equal to 9 square inches. This device has extra value when the hall or corridor is warmed.

For years, when opening the front door on a winter evening, it puzzled me to find out what became of the immense volume of chilly air which came rushing in. Two or three hundred feet entered per second, but the house seemed able to absorb it indefinitely. The answer is that the flues drew up a greater quantity, and the cold heavy air from the outside drives the lighter air in the house out by every ventilator and crevice that was acting as an inlet before the door was opened. To repeat, a flue, no matter how carefully constructed, does not have a fair chance unless an adequate air supply is introduced through the ceiling, floor, outside or inside wall.

Given an air supply, the next consideration is the flue. The majority of architects and builders feel certain that a 14×9-inch flue is much too large; and the proportion is stupid. The opening at the junction of the grate and the flue is seldom 36 square inches, and often much less. Chimney-pots vary in area from 40 to 60 square inches. Therefore, why so many by-laws insist on over 120 square inches for the flue is incomprehensible. A 9×9-inch flue can be more thoroughly cleaned, and works well enough

in districts where the by-laws permit. A 9-inch flue-liner has an area of about 60 square inches, and a 10-inch flue-liner of 78 square inches; my experience seems to show that they whisk the air away much more quickly than a parged 14×9 inch flue, in spite of its greater area. Liners fail to hold soot, which is continually falling down into the fire; and with no fire they make a down-draught smell very strongly of soot. The absence of corners seems to invite a down-draught, or else the smoothness tends to make the upward action in some flues so strong that they pull from others. Parging is a non-conductor, but has little value, and is seldom permanent.

Chimney-pots have this in common: the more efficient the uglier; but the reverse is not as true as potmakers would have us believe. Pots with the ordinary zigzag rim cause an up-draught much as the V in the body of a kite forces it up. Louvres, trumpet-mouths, spirals, and many other horrors force up the smoke when the wind blows; but even an Archimedean revolving cowl or a lobster-back is useless in still weather. Trumpet-mouthed blowers, or drain-pipes with the socket outwards, built into a stack at an angle of 45 degrees a few feet below the pot, will sometimes cure a flue that is only troublesome when the wind is in one particular quarter.

The value of at least two bends is always insisted on in specifications, but in practice the bends are often scamped, and are difficult to provide in the attics, especially when the fireplace comes between other flues. The reason for the undoubted advantage of bends is not obvious. The contraction which is usual in making them may have something to do with it; they may act slightly as baffle-plates, and, of course, the top bend catches the rain and helps to keep the lower part of the flue dry; probably under various atmospheric conditions all these reasons may have some truth in them.

The height of the chimney-stack is of the greatest importance; but again the reason is not obvious. When the wind blows at right angles to the ridge, the velocity must be greater nearer the ridge, and probably steadier. When the wind is not at right angles to the ridge, I cannot see how it can affect the flue. If the straightness of the flues in the chimney-stack above the roof helps the force of the smoke, it is curious that bends should be useful below. There can be no appreciable difference in temperature or atmospheric pressure at the top of two flues, one of which is five feet higher than the other; yet we know that five feet extra height to a stack may work wonders. That it is advisable to keep a flue warm is more obvious, for as soon as the smoke approximates in temperature to the atmosphere its tendency to rise is lost. All outside stacks should have 9 inches of brickwork between the flues and the weather. Single flues should be avoided, and above the roof

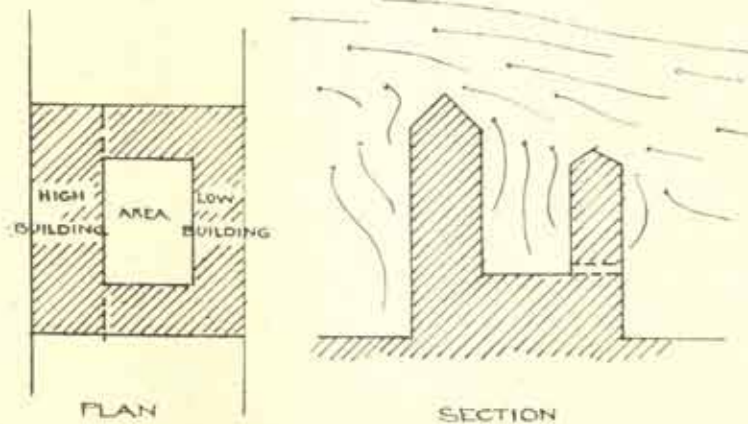
it is better to have 9 inches of brickwork on the most exposed side and end, even if there is only $4\frac{1}{2}$ round the rest of the chimney.

The plan of a stack and the direction of the wind seem to have no connection. A chimney much exposed to a west wind is just as likely to be satisfactory with its axis north and south as east and west. It is better to have the middle pots in a long stack raised a little above those at the ends, but the flue at the leeward end is just as likely to draw well as that at the windward.

We frequently hear it stated that on account of other buildings, trees, or mountains, the wind is deflected and rushes down vertically on to some unfortunate flue and drives the smoke back to the grate. That argument, I believe, is generally false. A strong wind acts on the principle of an hydraulic jet pump, or one of those little sprays for fixing a pencil sketch. It drags after

to the rooms. It was found in an important Liverpool building designed on these lines that the flues on the floor level with the bottom of the area smoked, but none of the others. Most buildings are not so fortunate, as a vacuum generally sucks impartially from all rooms round the area. An air trunk in the position shown by the dotted line would probably allow the vacuum in the area to be filled direct from the street and save the down draught.

Architects are frequently asked how it was that the old straight flues seen in mediæval work carried off the smoke. They were built to act as bacon-curers almost as much as smoke outlets, were perfectly straight, and large enough to be hand-swept by a grown man. My private belief is that they often did not draw (of course the smoke from a log fire is cleaner and less objectionable to our eyes and nose than coal smoke); but if they did



it the air on the lee side of an obstruction and tends to create a vacuum. All gardeners know that against a wind a hedge affords more protection than a wall. They believe that the wind swoops straight down on to the beds from the top of the wall. It does nothing of the kind. The wind goes rushing onward and creates a vacuum on the sheltered side, which air whirls eddying in to fill; the eddies destroy the plants. A hedge allows air to pass through the base and the eddies are avoided. It is the same with buildings; a strong wind sucks out the air from the sheltered corners. If the air that replaces it comes from the inside of the building the chimneys will smoke. A vacuum is especially likely to occur in a cul-de-sac, or an area with buildings on all sides. Take a plan as sketched, an oblong building with an area, and the block on one side rather lower than the others. If a strong wind blows directly on to the low roof, it will bound on to the high one and create a vacuum in the area. Should the gust be prolonged, air will rush out through the crevices in the walls and windows and transfer the vacuum

draw we may suppose that in those days people were less sensitive to draughts, and did not stint the supply of air to the grate.

It is a mistake for the public to ask an architect to cure a faulty flue. Alteration at the base is very seldom allowable—in the flue itself impossible; all that can be done is to raise the stack or crown the flue with somebody or other's patent cowl—and that is not architecture. Some day galvanised-iron cowls will be prohibited by the local by-laws. The life of the best and heaviest is not ten years—the stays will not last as long; thin cowls become a source of danger to the neighbourhood before three years are out: they are fixed in such a position that supervision is impossible. Many a fine building is ruined by them. To look at Piccadilly across the Green Park is really distressing. It is almost as bad to walk up South Castle Street and view the skyline of the North and South Wales Bank. But until we become learned in vacuums and acquainted with the science of draughts and air-currents, the cowl-making business will be ever increasing and ever prosperous.



9, CONDUIT STREET, LONDON, W., 19th March 1904.

CHRONICLE.

The late Dr. A. S. Murray [H.A.].

The formal announcement of Dr. Murray's death was made to the General Meeting last Monday by the Hon. Secretary, Mr. Alex. Graham, F.S.A., in the following terms:—I have to announce with very deep regret the decease of a highly esteemed and distinguished Honorary Associate, Dr. Alexander Stuart Murray, Keeper of Greek and Roman Antiquities at the British Museum. I am sure that no words of mine can strengthen the expression of opinion as recorded in the daily papers of the meritorious career of Dr. Murray. As architects we are under a debt of gratitude to Dr. Murray for his kind services and his co-operation with us in matters in which he was a master. He was acquainted with almost every branch of classic archaeology, and in one branch particularly, that of Greek sculpture, he was an authoritative exponent. I need say nothing with regard to his literary achievements: they must be known more or less to all of you; but I may say this, that in nothing that Dr. Murray ever put his hand to did he fail to achieve success. As a close reasoner and a thoughtful observer he belonged to a type of students that seems to be diminishing in numbers rather than increasing. And it is for that reason that we deplore the loss of so distinguished a *savant* as Dr. Murray. Many of us who have come in contact with him, not only here but in his official capacity at the British Museum, had good reason to look upon him not only as a friend, but as an adviser who was always ready to impart information on the many subjects of which he was a master. To us especially Dr. Murray will remain a pleasant memory, and members of the Institute who have seen him here, where he was a familiar figure on so many occasions, will always think of him as a kind friend and as a learned man. I need scarcely say that with that pleasant memory we cannot do less as an Institute than record our feelings by a sympathetic letter to his widow and relatives, in slight recognition of the kind services he has rendered to us, and in appreciation of his labours

in the cause of classic archaeology. I therefore ask you, gentlemen, to be kind enough in silence to approve of a letter being sent to his relatives expressing our feelings at the loss of so good and learned a scholar.

Alexander Stuart Murray was the eldest son of the late George Murray, and was born near Arbroath, in Forfarshire, on the 8th January, 1841. He was educated at the Royal High School of Edinburgh and at Edinburgh University, and was for some time a student at the University of Berlin, attending there the lectures of Boeckh and of other scholars of the heroic age. In February 1867 he was appointed Assistant in the Department of Greek and Roman Antiquities in the British Museum, and succeeded Sir Charles Newton as Keeper of the Department in 1886. Under his editorship and superintendence were issued a considerable series of catalogues and other publications dealing with the collections of his department. Volumes were also issued on the Greek inscriptions, the terra-cotta sarcophagi, the excavations in Cyprus, and certain groups of the vases. His chief unofficial works were a *Manual of Mythology* (1873), *History of Sculpture*, 2 vols. (1880, 1883), *Handbook of Greek Archaeology* (1892), and *The Sculptures of the Parthenon* (1903). Dr. Murray himself took part in the excavations at Cyprus, which brought to light the burying-ground of the original Greek settlers, and produced for the Museum a rich collection of dress ornaments in gold, ivory carvings of much artistic excellence, and pottery rivalling in interest and importance Schliemann's famous finds at Mycenæ. An account of them was given in a Paper read by Dr. Murray before the Institute in November 1899. Dr. Murray was elected an Hon. Associate in 1890, and had served on the Literature Committee since 1892. The following Papers read by him before the Institute have been published in the JOURNAL:—"The Sculptured Columns of the Temple of Diana at Ephesus" (JOURNAL, 21st November 1895); "Excavations in Cyprus" (*ib.*, 25th November 1899); "Two Ionic Capitals in the British Museum" (*ib.*, 11th January 1902); "A Fragment of the Parthenon Frieze" (*ib.*, 22nd November 1902). The Institute was also indebted to Dr. Murray for many contributions to the JOURNAL in the shape of reviews of books on his own special subjects.

Dr. Murray died, after a short illness, on Saturday, 5th March. He had just completed a course of lectures on Ancient Sculpture to the students of the Royal Academy, the last being delivered by deputy on Thursday, the 25th ult. At his funeral at Kensal Green the Institute was officially represented by the Secretary.

The Architects' Benevolent Society.

The Annual General Meeting of the Architects' Benevolent Society was held on the 10th March

1904, in the rooms of the Institute, 9, Conduit Street, Mr. Aston Webb, R.A., President, in the Chair. The Report of the Council was submitted and adopted as follows:—

"In presenting their Fifty-third Annual Report the Council have great pleasure in stating that the work of the Society has been well maintained in spite of many adverse circumstances. The country has not yet recovered the severe strain put upon it by the late war, which has naturally crippled the subscriptions to most charitable objects. Nevertheless this Society has had during the past year a small increase in its subscriptions, but it has also had a corresponding drain upon its resources, so that at the end of the year the Treasurer finds he has only a small balance in hand. The claims that have been made upon the Society during the past year have been very urgent, and in some cases, from architects who were formerly in good practice, but who, through sickness or other causes, have found themselves unable to continue their work.

"Gratitude has been described as a sense of favours to come; but happily this is not always true, as is evidenced *inter alia* by the following letter received by the Secretary from the nephew of a lady (the widow of an architect) who had on many occasions been assisted by the Society:

" 26th June 1903.

"DEAR SIR,—I regret to inform you that Mrs. — passed away on Thursday morning at 8 o'clock on June 25th; she left a written request that I should write and thank you for your great kindness to her in her adverse circumstances. She wrote down the following words on June the 10th: "I thank each one with my whole heart, and pray that God will bless them and keep them, and reward them a hundredfold for their goodness to me, who have ministered to my necessities, and have made my last years on earth so truly comfortable."

"I remain yours respectfully,"

"The Council regret the loss through death of the following subscribers:—Mr. J. F. Wadmore, Mr. Francis Edwards, Mr. Herbert Ford, Mr. Henry Saxon Snell, and Prof. T. Roger Smith.

"The total amount of subscriptions received during the past year is £554. 16s., and the pensions and grants amounted to £880. 2s. 6d.

"The following gentlemen retire by rotation from the Council:—Mr. Sydney Smirke, Mr. H. L. Florence, Mr. Graham C. Awdry, Mr. J. T. Christopher, and Mr. F. T. Baggallay.

"To fill the vacancies caused by these retirements the Council desire to nominate Mr. T. E. Collett, Mr. Rowland Plumbe, Mr. G. T. Hine, Mr. Wm. Grellier and Mr. Ambrose Poynter.

"The Balance-sheet and Income Account for the year ended 31st December 1903, audited by

Mr. Henry A. Hunt and Mr. Edmund Buckle, are submitted.

"The sincere thanks of the Society are due to the R.I.B.A. Council for the use of their rooms, and Mr. Locke and the other officials have rendered material assistance which is cordially appreciated.

"Donations have been received from the following gentlemen:—Mr. Graham C. Awdry, £25. 10s.; Mr. F. T. Baggallay, £10. 10s.; Mr. John T. Christopher, £5. 5s.; Mr. Percivall Currey, £5. 5s.; Mr. Ambrose Poynter, £5; the Tylers' and Bricklayers' Co., £5. 5s.; Mr. H. Walter Lonsdale, £5. 5s.; Nottingham Architectural Society, £5. 5s.; Mr. Aston Webb, R.A., £5; Mr. F. W. Tasker, £5. 5s.; Mr. H. Cheston, £5. 5s.; and Mr. David Morgan, £5. 5s., &c."

The President, in moving the adoption of the Report, drew attention to the remarkably low cost of working the Society; it hardly came to ten per cent. of the receipts. He called attention to the fact that the members of the Royal Institute numbered 1,830, and out of that number only 350 were subscribers to the funds of the Architects' Benevolent Society. The architects practising in the United Kingdom numbered over 4,000. The Society was not an Institute Society; it was for all architects, and it helped anyone, the only requirement of applicants being that through no fault of their own they had fallen into distress. All architects ought to unite in the education of the young and in helping the aged, the infirm, and the unfortunate. The stock-in-trade of an architect was very small, consisting of his brain and senses, and if one or other failed he fell into want. During the year £211 had been granted to ten pensioners, and £618 had been distributed among fifty-four applicants for relief. The subscriptions of the Society, amounting to £554, showed an increase as compared with last year, but the donations only amounted to £96 12s.—the worst year in this respect for a long period. The applications had extended from Dublin to South Africa, and he thought they had a right to ask all architects for support. A large majority of the supporters came from London, and the applications for relief mainly from the country. Many well-known architects' names were not to be found on their list, but he hoped they would join.

The Report having been adopted, the Council were elected on the proposal of Mr. Macvicar Anderson; Mr. W. Hilton Nash and Mr. Percivall Currey were re-elected Hon. Treasurer and Hon. Secretary respectively; and Mr. Henry A. Hunt and Mr. John T. Christopher were elected Auditors.

Liverpool Cathedral.

At the Liverpool Architectural Society on the 7th inst. Mr. G. Gilbert Scott, joint architect of the Liverpool Cathedral, gave an address explanatory of the cathedral, and exhibited drawings of the building to be erected on St. James' Mount.

Mr. Scott explained that in preparing his design he decided that solemnity was to be its keynote, and this included dignity, grandeur, and simplicity. The whole effect at which he aimed was to be produced by the massing, grouping, and proportion of the various parts. No amount of rich ornament could, to his mind, equal the beauty and charm of a blank wall relieved by a touch of rich detail. This lack of blank wall was, perhaps, the least satisfactory feature of our fine old cathedrals. In designing a modern cathedral the first thought that occurred was how to treat the central space. He felt convinced that the central space must be so designed as to form the predominating feature of the cathedral, both inside and out, and the planning and designing of this important part was the first difficulty to be got over. He was compelled, however, to abandon the idea of treating a large central space satisfactorily, but he still felt that whatever form the central feature ultimately took, it must, above all things, be the crowning feature of the exterior, so that the eye would be carried up from the less important parts to it, the latter in their turn giving scale and, as it were, supporting the central pile. The actual floor area of the central space, as now planned, was not less than the area of the octagon at Ely, which fact helped them to realise that the space at the crossing was not so small as was commonly imagined. Some had remarked that the central space would be very dark; but they had evidently not noticed the four windows which opened directly into the central space. The great windows at the end of the tower transepts would play an important part in the lighting of this space. The adoption of the cross transepts in the nave and choir was not decided on merely because the idea was novel, but originated from a feeling that the Byzantine and Renaissance form of vaulting, namely, with domes and barrel vaults, was a far more impressive and dignified way of roofing a space than the intricate and fanciful, though no doubt beautiful, vaultings of Gothic work. All the mouldings, etc., were being designed by Mr. Bodley. The red sandstone to be used lent itself to large and simple mouldings, and it was fortunate that this stone was especially adapted to a type of moulding which would be thoroughly in character with the rest of the building. The original intention of having a great western court flanked by cloisters had been abandoned owing to the limitations of the site. Unfortunately there was no direct approach to the west end. If they could have arranged a fine road leading from the west front it would have been easy to get such a fine feature as suggested, with steps running the full width of the court from cloister to cloister. Although the site had several faults, it was on the whole a very fine one; it possessed a feeling of romance, which he hoped would be increased when the vast pile was completed.

ALLIED SOCIETIES.

LEEDS AND YORKSHIRE SOCIETY.

The Sketching Excursions of the Birmingham Association.

The eighth general meeting of the above Society was held on Thursday, 10th March. Mr. Butler Wilson [F.] presiding. Amongst those present were Messrs. Richard Wood, G. F. Bowman, W. H. Thorp [F.], H. S. Chorley [A.], H. A. Chapman [A.], W. G. Smithson [A.], Robert P. Oglesby, Percy Robinson, G. E. Reason, and others. At the conclusion of the customary business, which included the nomination of officers for the ensuing session, a paper on "The Sketching Excursions of the Birmingham Architectural Association" was delivered by Mr. C. E. Bateman [F.], and illustrated by 150 fine lantern slides prepared by Mr. John Ward. These views covered most of the ground traversed during the ten years of these annual excursions, and a map was exhibited indicative of the various centres of operation, which included the following:—Broadway, Ludlow, Oxford, Tewkesbury, Cambridge, and Ely, Cirencester, Stamford and Peterborough, Burford, Banbury and Kettering. A vote of thanks was tendered to Mr. Bateman and Mr. Ward on the motion of Mr. H. A. Chapman [A.], seconded by Mr. H. S. Chorley [A.], and supported by Mr. Robert P. Oglesby, who elicited from the lecturer some practical details with regard to the conduct of these excursions with a view to similar excursions being instituted by the Leeds Society.

MINUTES. X.

At the Tenth General Meeting (Ordinary) of the Session 1903-04, held Monday, 7th March 1904, at 8 p.m.—Present: Mr. Alfred Darbyshire, F.S.A., *Vice-President*, in the chair, 13 Fellows (including 6 members of the Council), 29 Associates (including 1 member of the Council), 2 Hon. Associates, and numerous visitors: the Minutes of the Special and Business Meetings held 29th February [pp. 251-2] were taken as read and signed as correct.

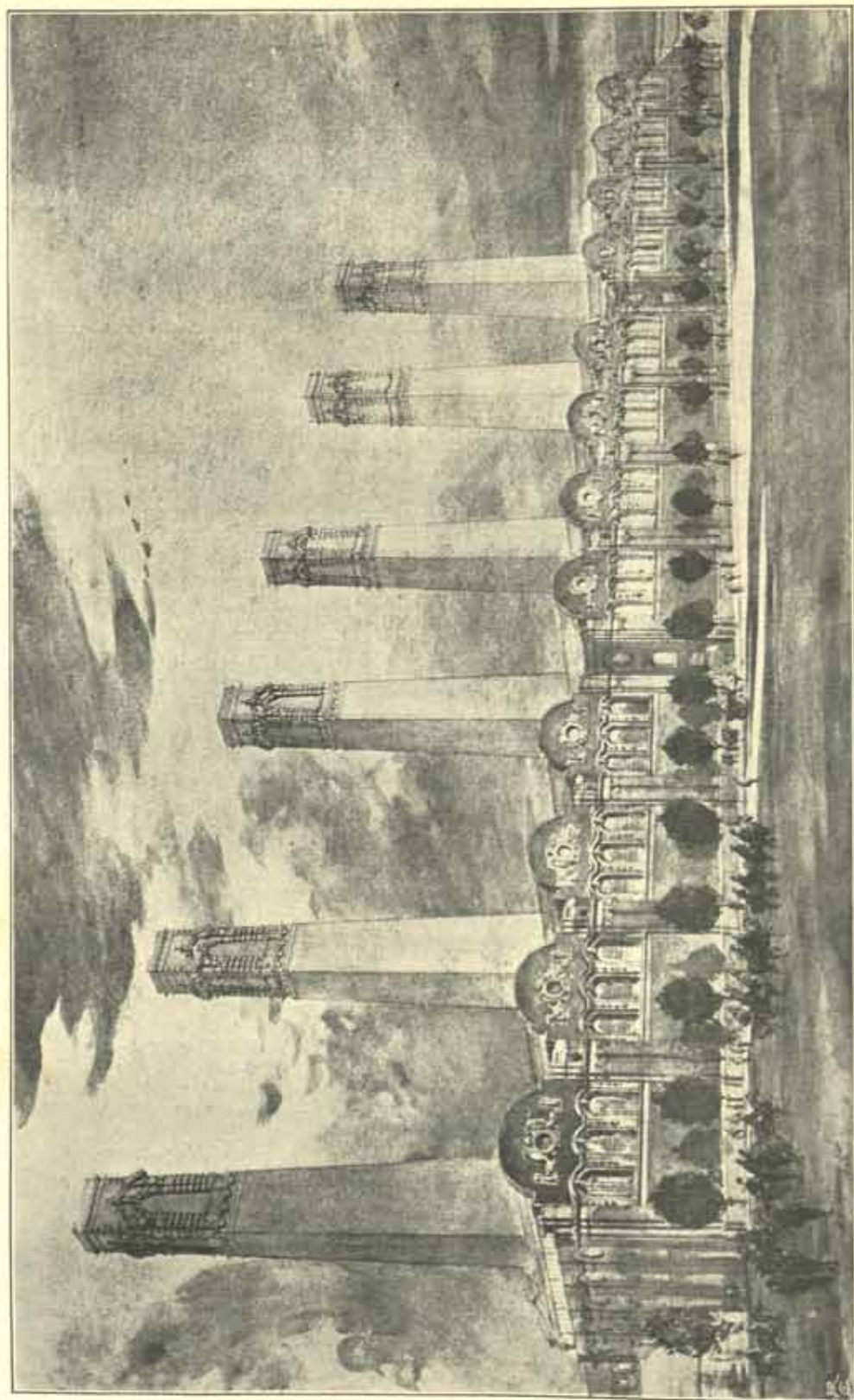
The Hon. Secretary announced the decease of Joseph William Twist (Bloemfontein), *Associate*, elected 1891.

The Hon. Secretary also announced the decease of Dr. Alexander Stuart Murray, *Hon. Associate*, and having referred to his eminent services to classical archaeology and to the esteem in which he was held by members of the Institute, it was Resolved that the regrets of the Institute be recorded on the Minutes, and that a letter of sympathy and condolence in their bereavement be sent to his widow and family.

The following members attending for the first time since their election were formally admitted by the Chairman—viz. Arthur Edward Bartlett and Henry Winter Johnson, *Fellows*; Thomas Frank Green, Andrew Rollo, Thomas Henson Robinson, and George Leonard Russell, *Associates*.

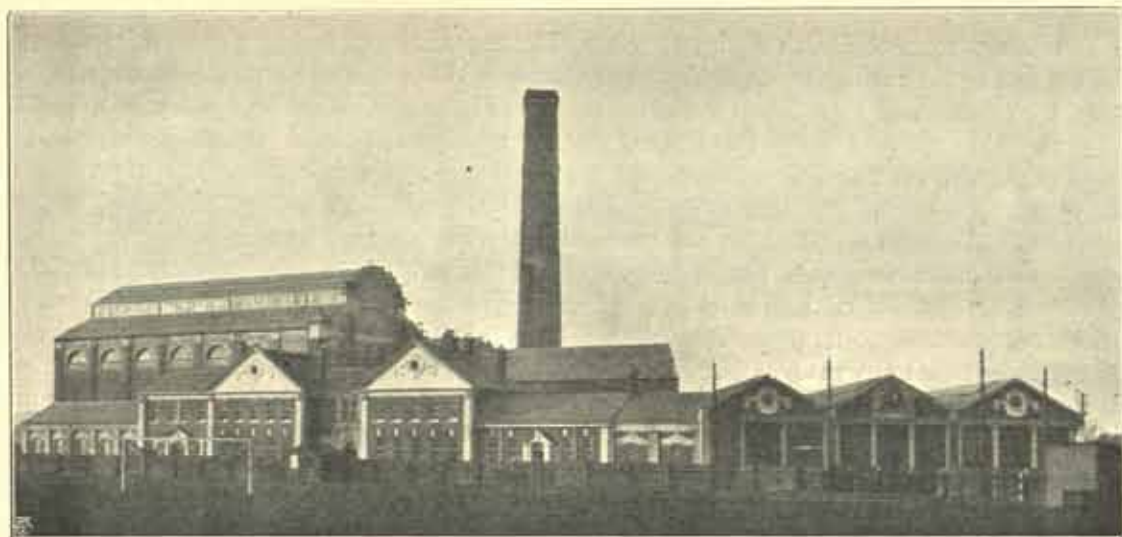
A Paper by Mr. J. D. Crace [H.A.] on PLASTER DECORATION having been read by the author, illustrated by lantern slides, and discussed, a vote of thanks was passed to Mr. Crace by acclamation, and briefly acknowledged.

The proceedings then closed, and the Meeting separated at 10 p.m.



From a Water-colour Drawing by B. D. Adaboud.

THE POWER STATION OF THE CENTRAL ELECTRIC SUPPLY COMPANY, LTD., GROVE ROAD, ST. JOHN'S WOOD, LONDON.



ELECTRICITY WORKS OF THE CORPORATION OF IPSWICH: NORTH-EAST VIEW.

NOTES ON THE DESIGN AND CONSTRUCTION OF BUILDINGS CONNECTED WITH THE GENERATION AND SUPPLY OF ELECTRICITY KNOWN AS CENTRAL STATIONS.

By CHARLES STANLEY PEACH [F.].

Read before the Royal Institute of British Architects, Monday, 28th March 1904.

IT has been the province of the architect in all ages to play an important part in the successive stages of the economic development of mankind, to keep in touch with his times, and to express in the buildings the sentiments dominating the period in which he practised his art. Thus the buildings of every period indicate the habits and mode of life of successive generations, and show posterity what men did and thought in bygone days.

The most noticeable feature of our times is the rapidity with which scientific discoveries are applied to commercial purposes, in consequence of which new industries constantly arise. The buildings required for these industries form an important branch of modern practice. Therefore, not only are they of considerable interest to the architect as being work with which he is immediately concerned, but it is essential that they should be closely studied if the architect is to maintain the traditions of the past and to take a like prominent part in the progress of the present day. That which is passing before our eyes does not attract like that which is woven into the warp of history; so it is not to be expected that the same interest can be aroused for buildings serving a modern purpose as for those connected with vocations or occupations which have been followed by mankind for centuries. Undoubtedly, buildings to which the romance of the government or of the religion of a nation is attached, the dwellings in which individuals of the race have been born, and lived, and died, must ever exercise a greater fascination over mankind than those in which their lives are spent toiling for their daily bread. Indeed, the latter buildings often seem to be regarded as of small account, as though they were something altogether apart from the life of the people, instead of being as they are, to a vast majority, the alpha and omega of existence.

Buildings connected with engineering are often regarded as coming within this category and are not as interesting to the architect as they should be. It seems strange that it should be so, for science and its allied useful arts exert more influence on the prosperity of a nation than anything else. Among these arts, that of manipulating and diverting the greatest forces of nature, turning them to account for the benefit of mankind, is one of the most important.

The buildings in which these achievements of science are performed, just as the "day's work," will doubtless obtain from posterity some measure of esteem, as places associated with the marvellous work carried on by men of the present day, and this, as their characteristic features become familiar, may even arouse interest in their construction, form, and embellishment. At any rate, as buildings characteristic of the period in which they are erected they may claim, even to-day, some position in architecture, a position which will probably rank higher in the future, as the relation of electricity to modern life and the profound influence which it is exercising on civilisation becomes better known. The associations connected with a building, acting on the imagination, often cause its architecture to command an admiration out of all proportion to the intrinsic merits of the edifice, because it is difficult to disassociate the form and design of the walls themselves from the sentimental interest evoked by the events which have taken place within them. If the importance of the purpose for which the building is required is not fully appreciated, it is often difficult to remove the obstacles which stand in the way of suitable architectural treatment.

The buildings connected with the generation and supply of electricity—commonly known as central stations—are a conspicuous example of the structures required by modern scientific industries. In less than twenty years they have developed from small commonplace sheds to complex structures frequently of great size, occupying prominent sites, and supplying power for innumerable purposes. Upwards of 750 of these buildings have in about fifteen years been erected in the United Kingdom alone, and a much greater number abroad. Although unusual in many respects, even from the very commencement, the early stations did not exhibit in a marked degree those special features now associated with them. This is not surprising, because when the industry started the demand for energy—in other words, the business of the undertaking—was in existence before sufficient progress had been made in electrical knowledge to enable the want to be supplied.

The advantages of electricity, however, were appreciated sooner abroad than in Great Britain, and so the industry had made considerable progress in foreign countries before a fair start was made here. The lead thus gained has never been lost, and therefore it is useful to study foreign practice, for that which obtains abroad to-day is more or less that which will be put into practice in England to-morrow, and foreign stations become a useful guide to what should be provided for future extensions.

In this country also it was hampered for a time by unfortunate legislation, but the moment this was altered the industry burst into existence suddenly; it developed with extraordinary rapidity, the capital invested in it increasing from a few thousand pounds in 1888 to upwards of £64,000,000 in 1903. Designs were therefore prepared with the utmost speed, the work was rushed through as fast as it could be done, invention proceeding simultaneously with construction. Frequently machinery was installed and current generated and supplied long before the works were finished, and while building operations were still in progress, and while electrical knowledge was still in rather a rudimentary state. Under such conditions it is obvious that some points could not fail to be overlooked, for designs could not receive the full and deliberate thought which is necessary for the successful solution of new and difficult problems.

The various systems of supply have also been in a continuous state of evolution, and requirements have constantly changed. So the buildings first erected were quickly superseded by other types, and information obtained from existing buildings is not so generally useful as it is in cases where slower progress on more settled lines has taken place.

Now matters are assuming more or less definite shape. The present, therefore, seems an opportune moment to consider the buildings recently erected and those which are likely to be required in the immediate future.

Primarily Central Stations may be divided into three classes :—

1. Power Stations.
2. Sub-stations.
3. Direct Supply Stations.

The latter being subdivided into two types :—

(a) Simple; and (b) Composite.

The distinction between these classes is fairly well marked, but to some extent they merge gradually into one another and classes and types overlap. In each class there are several different kinds dependent on the source from which power is derived. First, if from the natural elements—air, water, electricity; secondly, from the conversion of natural products—coal, oil, or gas.

Further subdivisions of each class and type arise under headings too numerous to mention, among which the kind of plant installed, the actual and relative position of plant in the buildings, and method of working and combination of plant, are among the most important. Although at first sight these different types and classes appear very similar they are really very different, but the common purpose which they all serve naturally gives rise to many special features present in all.

The power station is the class now coming into vogue, and is the real central station. It is the centre at which power is generated for the district allotted to it, whence it is supplied in bulk to sub-stations for distribution. Larger and more powerful machines are usually installed in power stations than in other classes.

The sub-station is the satellite of the power station. Its province is to receive the power from the central source, and retail or distribute it to consumers in its immediate vicinity.

There are two principal subdivisions :—

- (1) Sub-stations housing machinery, and batteries or accumulators for storing electricity.
- (2) Sub-stations without storage and accommodating machinery only.

The direct supply station is a centre at which the power is both generated and distributed. The simple direct supply station comprises the machinery departments only. The composite direct supply station is rather an electricity works, and contains, in addition to the rooms for machinery, accommodation for many other departments of the undertaking, such as meters, mains and roadwork, tramways and administration departments, sometimes also destructor, &c., but the accommodation of these stations varies considerably in every case.

Obviously the initial source of power is that which exercises the greatest influence on the design and construction of a central station. As might be expected, the more directly the natural element is employed, the fewer processes are involved and the more simple is the building required.

POWER STATIONS.

The simplest kind of power station is that in which air or wind is used as the source of power. There is at present only one station of this kind. It was erected in 1902 at Askov, and consists of a single room containing dynamos and accessory machinery. The windmills are above the building and are connected to a counter shaft, whence the dynamos are driven by belts. It is reputed to have run continually since that date, with small but satisfactory results.

A great number of stations using water as the source of power have been erected abroad, but there are none at present of first-class importance in Great Britain. The water-power station is usually a one-story building above the ground line, having one, and occasionally two or more principal rooms. In the engine room is placed electrical plant, dynamos and switchboard, the turbines or water-wheels being in chambers, tunnels, or races below the floor level. The turbines and dynamos are nearly always directly coupled together by a shaft, and not driven by belts or ropes. If the current is generated at comparatively low tension and transformed up for transmission, the electrical plant is usually arranged in two rooms, the step up high tension transformers being separated from the generating plant. A few small offices are required for the engineer-in-charge, and rooms for the staff.

If the mains are taken overhead the switchboard is often placed in an annex to the engine room, and forms the end, or part of a side. This is a good arrangement, as a separate chamber for the mains is thus formed, which, being carried up as a tower, enables the mains to leave the station from the top at a sufficient height above the ground. If the mains are laid underground the same arrangement of switchboard is sometimes adopted; the space at the back forms a convenient mains room whence they descend to the culverts under the roadway.

The flumes, aqueducts, weirs, and sluices required for diverting and controlling the water and directing it to the turbines, and for leading it back to its natural channels; the foundations of these buildings, honeycombed with chambers and tunnels, are the most interesting parts of the works. Their construction requires considerable technical skill, as almost every kind of vault, dome, and curved structure meeting and intersecting at every kind of angle is to be found in these buildings.

Probably Niagara is the best known water-power station. The reservoirs are the great lakes of North America, which are said to contain upwards of 6,000 cubic miles of water, covering an area of 90,000 square miles. The natural aqueduct is the Niagara River, the channel of which is about a mile wide, but bifurcates into two narrower channels just below the power station. The river descends 55 feet in the rapids above the falls, and has a depth of over 20 feet over the crest, where it descends in the principal fall 165 feet more. The volume of water has been calculated by Professor Unwin to be upwards of 275,000 cubic feet per second, and it is estimated that these falls represent 7,000,000 h.p., the greater part of which can and eventually will be made available. In other words, a force equivalent to the consumption of over 200,000 tons of coal per day (being practically the daily output of the coal mines of the world), or the combined effort of 49,000,000 men, or which would raise over 100,000,000 tons one foot high in one minute, will be penned in and controlled in the buildings. The machines dealing with this power must all be fixed rigidly in one place, and will be concentrated in a comparatively small area.

An example like this brings forward very forcibly a point in the design and construction of these buildings which deserves careful consideration.

This concentration and fixing of machinery of enormous power within a building is a

new feature. It may be that there will be but few other stations quite as powerful as Niagara, but even those of 150,000 or 200,000 h.p., with probability of considerable future enlargement, of which many are now in course of erection, insignificant as they seem by comparison, will nevertheless enclose and uphold forces infinitely greater than anything which has hitherto been contained in a building. It is obvious that it is both advisable and economical to calculate the structure with an ample margin of safety, and to allow considerable strength above what would be considered sufficient in ordinary practice. This is necessary, not only that the buildings may be strong enough in the first instance, but also that they may be durable and capable of that considerable enlargement which will be required as years go on.

The power station of Niagara was designed by Messrs. McKim, Mead and White, of New York, Mr. W. A. Brackenridge being the engineer. It is faced with limestone, hammer-dressed, and is a plain but effective building. The engine-room No. 2 is 462 feet long by 62 feet wide, and 60 feet high. The first half of engine-room No. 1 is 450 feet long by 62 feet wide, 39 ft. 6 in. to springing of roof, and 60 feet to ridge. There are 21 generators installed of 5,000 h.p. each. The turbines are 140 feet below the dynamos, to which they are connected by perpendicular shafts about 140 feet long. Each generator weighs 170,000 lbs., of which 79,000 lbs. is the weight of the revolving element, working normally at 250, but capable of a maximum of 400 revolutions per minute. When the whole work is complete, over 48,370 tons will be revolving in the buildings at this speed day and night. The present output is 105,000 e.h.p.

There are other large water-power stations in America, notably at Sault Sainte-Marie, Michigan, where the power is obtained from the rapids of the Sainte-Marie River between Lake Superior and Lake Huron, where it is estimated that about 260,000 h.p. is available. This station is nearly as powerful as Niagara, as the plant already installed is capable of developing 60,000 h.p. In both these stations the turbines are directly coupled to the engines.

The city of St. Paul, Minnesota, also derives energy from a water-power station, situated on the Apple River, Wisconsin. In this case the current is generated at 800 volts, is transformed up to 25,000 volts, at which tension it is transmitted, and is transformed down in the sub-stations in the city before being distributed.

The power house is a plain brick structure 144 feet long by 57 feet wide, on masonry foundations, and consists of two rooms. The plan is somewhat unusual, because in the larger are placed the dynamos, switchboards, and transformers, and in the second room, the water-wheels and accessories. The water is brought to the wheels by a steel penstock on the outside of the wall, with branches to the interior. The mains leave the building from a tower over the switchboard, and the current is conveyed by overhead conductors to sub-stations in the city.

Some of the European water-power stations are interesting examples of well-studied architectural treatment. Full advantage has been taken of the shape of the building required for the arrangement of plant. The most important members of the construction have been accentuated in the elevations, and the buildings have been carefully grouped to accord with the locality in which it has been necessary to erect them. Perhaps the most picturesque is the power station at Tivoli, on the Tiber, erected in 1891 [fig. 1]. The energy for the city of Rome is generated at this station, whence it is transmitted seventeen miles at a tension of 5,500 volts to the sub-station at Porta Pia, in Rome. The works are almost monumental in character.

The great aqueduct which brings the water to the power house is a striking instance of the application of old-time methods of building to modern requirements. It bears a strong resemblance to the Aqua Virgo of Agrippa, and the general construction is practically the same as

other aquæ built in the time of the Roman Empire. The purpose, too, is not dissimilar, since it is to minister to the wants of the "Eternal City."

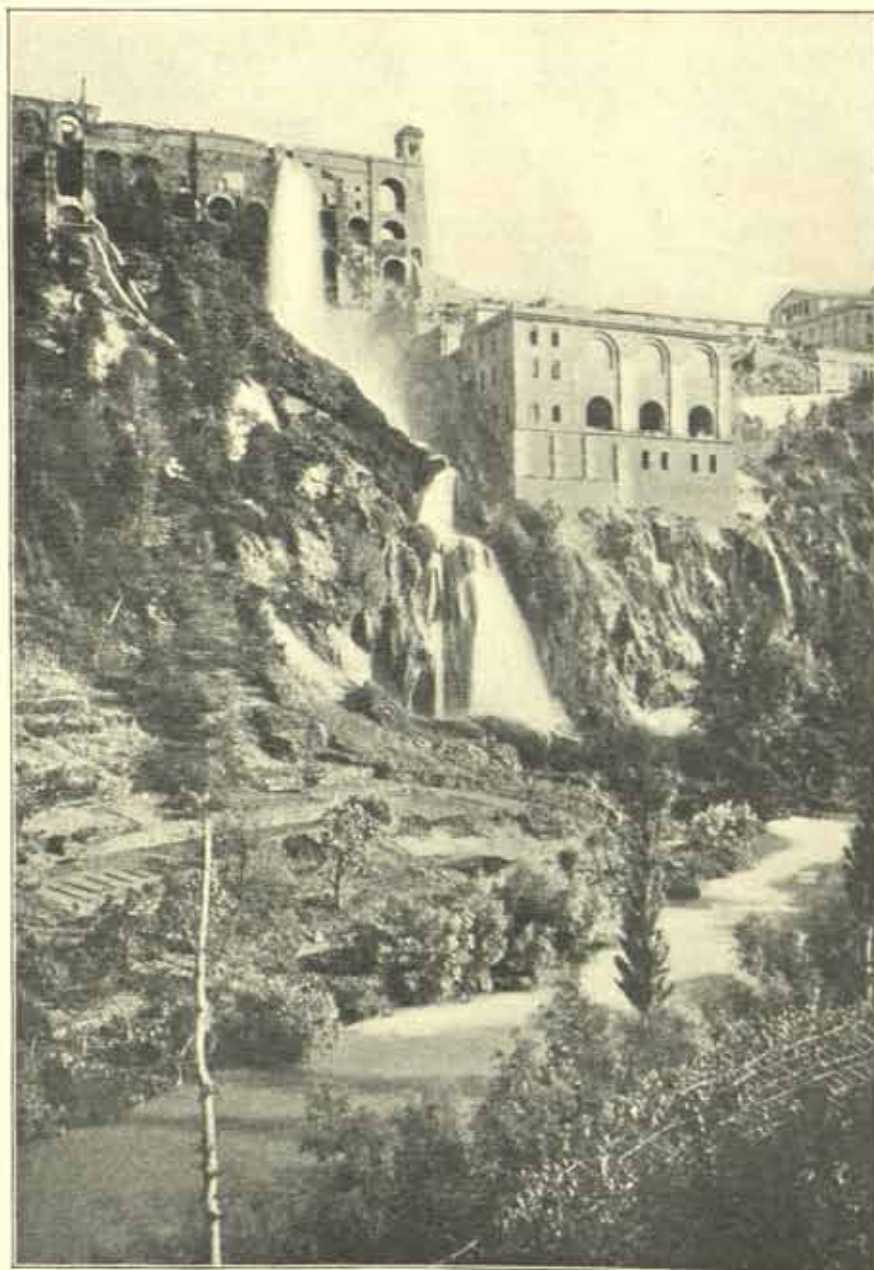


FIG. 1.—THE ELECTRIC POWER STATION AT TIVOLI, ON THE TIBER.
(Reproduced by permission of the proprietors of CASSELL'S MAGAZINE.)

As it follows its winding course through the hills, its arches rest in many places on the site of an ancient aqua, with which it is almost incorporated, as was the Roman custom.

The aqueduct has a capacity of 425 cubic feet per second, and the smaller conduit which carries the water to the turbines has a capacity of 140 feet per second.

The power house is as simple as a building well can be. It seems to cling to the hill, and to be almost part of it. The plain wall surface and the few arched openings, eminently

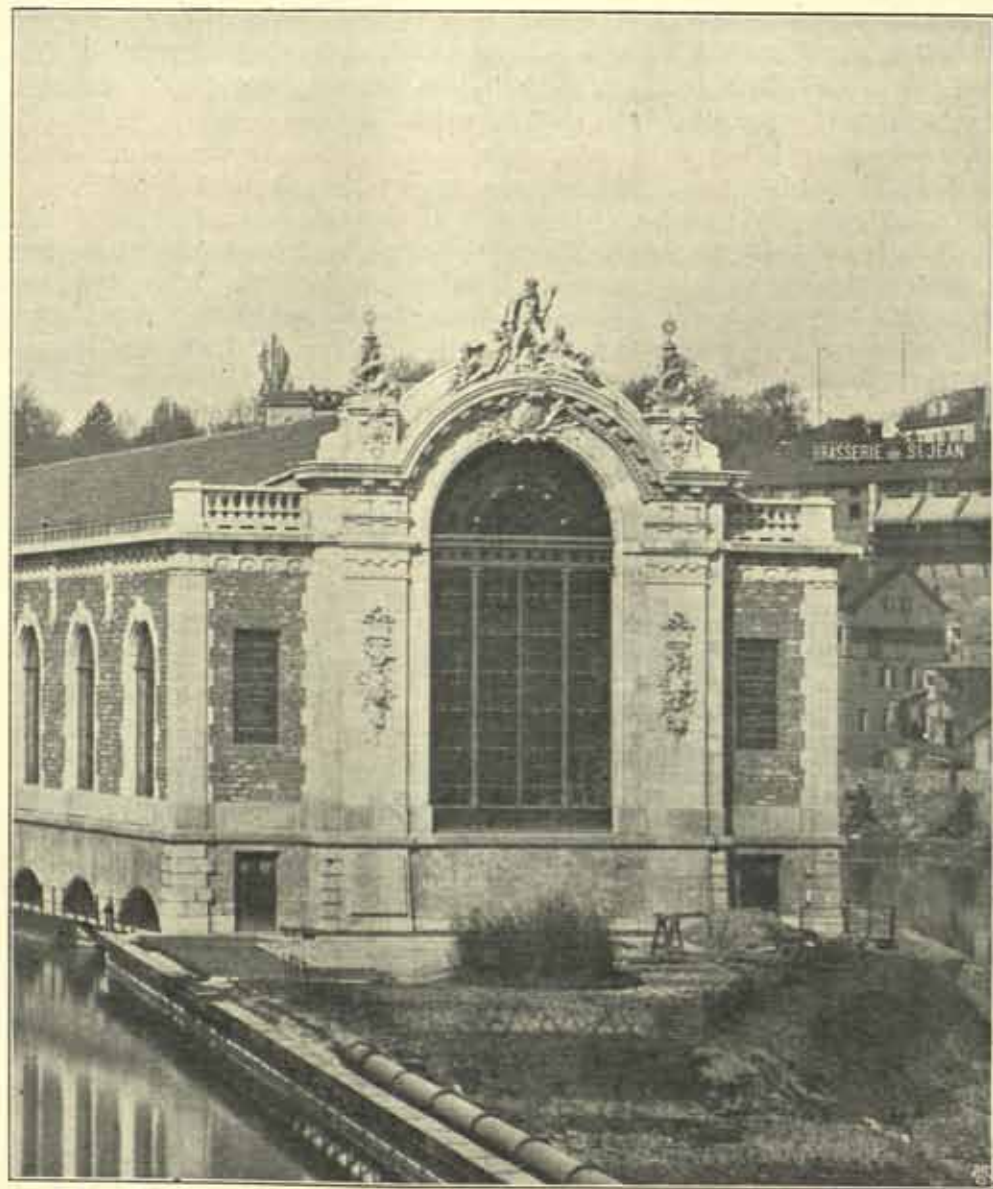


FIG. 2.—THE 6,000 H.P. WATER-POWER STATION OF THE MUNICIPALITY OF GENEVA. FROM THE PONT DE LA COULOUVERIE.

suited to the climate, harmonise perfectly with the dark green of the cypress, the varied colours of the vine, and the grey foliage of the olive trees which clothe the country round. The beauty of the neighbourhood has not been spoilt, although it has been necessary to erect a building to serve a utilitarian purpose and for the benefit of another city many miles away.

Of almost equal architectural interest, though of a different kind, is the first power station

at Geneva, situated at the outfall of the Rhône from Lake Léman [fig. 2, and pl.]. It is in the heart of the city, and occupies a very prominent site. It was erected in 1886 under the direction of Colonel Turrettini, Director of Public Works for the Municipal Council.

The engine-room is a separate building from those containing dynamos. It contains the pumping machinery—water being the transmitted power instead of electricity. It is a building of considerable architectural merit. In it eighteen turbines of 300 h.p. each are installed, which pump the water under pressure to sub-stations, where it actuates turbines direct coupled to horizontal dynamos, which in turn generate the electric energy used in various sub-districts of the city. The station, which supplies energy mainly for lighting purposes, stands on an island in the lake, opposite to the Isle de Rousseau, has also been carefully designed, and is not unsightly although a very plain and simple building.

The second water-power station of Geneva is at Chèvres, four miles out of the town, below the junction of the Arve and the Rhône [pl. xv., xvi.]. It is of the ordinary type, containing turbines direct coupled to dynamos. It was erected in 1892. It is a long, low stone building 492 feet by 103 feet wide. The engine-room is 448 feet by 98 ft. 6 in., and 30 feet high from ceiling to floor, and accommodates fifteen turbines of 1,200 h.p. each coupled direct to dynamos, the total output being 18,000 h.p. The dynamos weigh about 154,000 lbs.; the moving part of the machine weighs 35,200 lbs., and revolves at a speed of 80 revolutions per minute. The energy is generated at a tension of 2,400 volts. The works were completed in 1896, and were carried out under Colonel Turrettini and M. Buttiaz.

An important German water-power station is the Rheinfelden, fifteen miles above Basle, on the Rhine [fig. 3]. There, about 12,000 h.p. is installed. It was designed and erected by

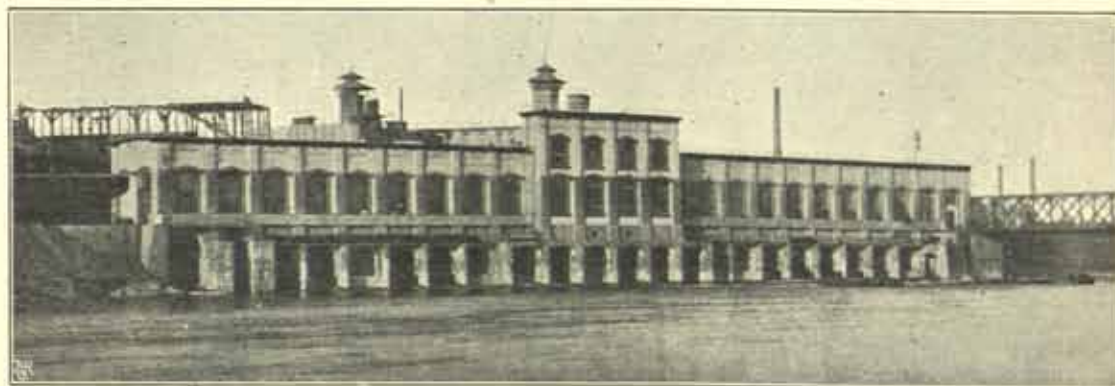


FIG. 3.—THE 12,000 H.P. WATER-POWER STATION OF RHEINFELDEN.

the Allgemeine Elektrizitäts-Gesellschaft of Berlin. There are also important installations at Jajce, on the river Pliva, in the province of Travnik, Bosnia, where about 9,000 h.p. plant is installed; at Corbières, in France, at the entrance to Gorges of Saint Georges near Axat, Department of Aude. In this station power is derived from a fall 100 metres high. There are eight units of 800 h.p. water turbines direct coupled to dynamos; 6,400 h.p. at present installed.

Although there is not likely to be any great demand for water-power stations in England, they are worth careful study, for many things can be learnt from them which can well be applied to the improvement of steam stations.

By far the greatest number of stations derive their power from the conversion of natural

products, the chief of which is coal. The steam-power station, which is a class of comparatively recent introduction, is a more complicated building than the water-power station. Owing to the larger size of the rooms, the greater number of departments, and the more complicated construction required, these buildings present even greater opportunities to the architect. No doubt there will be a great demand for them in the future, for they are the direct outcome of the system of generation and supply which now seems in a fair way to receive general acceptance. These stations generally consist of—

Engine house, in which are placed the engines and dynamos, the apparatus for the control of the current and mains leaving the station. If condensing plant is used the necessary apparatus is placed either on a gallery, at the floor level, or below the floor of the engine room.

Storage of electricity. A battery room for accumulators.

Boiler house, in which are installed boilers or steam generators, of which there are many kinds; the main flues, and apparatus for feeding coal to the boilers, and for removing ashes. The economisers for heating the feed-water are also placed in this building.

Pump room. Sometimes an annex, but often an enclosed place in the boiler house.

Chimney shafts.

Coal store, which should provide ample space for fuel and for handling coal, and for the conveying apparatus for bringing coal into the store. In connection with this department there are often railway sidings or similar works.

In connection with the first three departments, workshop and general stores, offices for engine-room staff, mess rooms, lavatories, w.c.'s, &c., for men.

Water department, in which are feed-water tanks, frequently also water-softening plant, cooling towers, and sometimes cooling ponds or lodges. Frequently a separate pump-house or building for condensing plant.

Probably the first station of this kind was that of the London Electric Supply Corporation at Deptford, designed by Mr. Ferranti in 1888 [fig. 4]. A part only of the station as first planned has been built. The original design, as will be seen from Mr. Ferranti's pencil sketches, contemplated a two-bay engine room one story high, with a four-story boiler house parallel to it and divided by one main wall—very similar to the prevailing type of American town stations of the present day.

The boiler house was 200 feet long and 90 feet wide, and contained 24 boilers on the ground floor. The floor over was designed for 24 boilers, and above this a coal store with sloping floor (the first of this kind), having a capacity of 4,000 tons, whence the coal descended by gravity to the stoking floors. The chimney shafts, of which there were two, were peculiar, as each contained four flues, two to serve the upper and two the lower boilers. Each engine-room bay was to be 200 feet long and 66 feet wide, provided, one with a travelling crane of a capacity of 25 and the other 50 tons. The first bay next the boiler house was designed to contain two 1,800 h.p. engines, driving dynamos by ropes, the current being generated at 10,000 volts.

The second bay was designed to receive four 10,000 h.p. engines and dynamos.

Although the original design has not been carried out in its integrity, and the character of the building has been considerably changed by additions subsequently made to it, it was at its inception simply a power station, and conceived with a wonderful prescience of the line upon which the system of generation and supply of electricity was likely to develop in the future. It was perhaps somewhat premature, but it undoubtedly pointed the way to what is now being done both in this country and abroad. Some of the great power stations erected in America ten years later followed very closely on the lines of Mr. Ferranti's design.

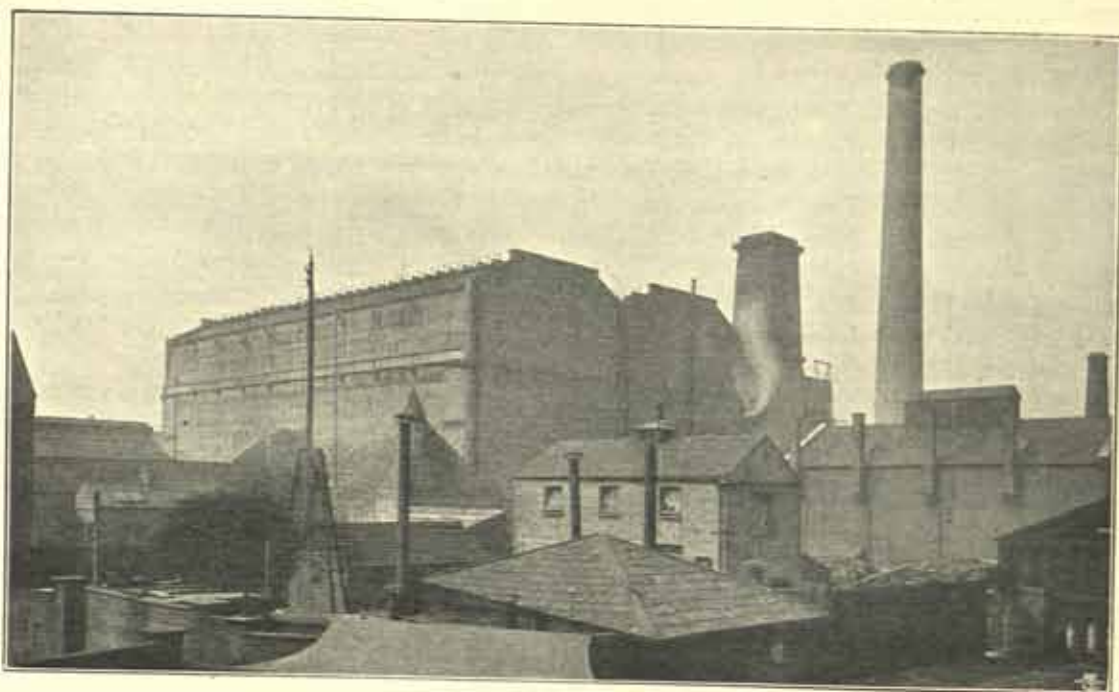


FIG. 4.—DEPTFORD POWER STATION OF THE LONDON ELECTRIC SUPPLY CORPORATION, LTD.

There are great differences in the arrangement of these buildings, even when the same kind of machinery is installed. To some extent these arise from local customs or climate, but more frequently from individual ideas. In foreign countries many stations have been designed by architects and engineers in the employ of very large companies which take a contract for the complete electrical supply of a town or district and manufacture and supply the plant. Hence there is a great similarity in places served by the same company, but considerable difference between adjoining districts and between one country and another.

In America, owing in a great measure to the system of laying out the towns in blocks of uniform size and shape, it is difficult to obtain large areas of land in cities. The price also is high, hence American town practice inclines to a rectangular building of the superficial area of a city block. The building is divided nearly centrally by a main division wall, on one side of which is placed the engine house, on the other the boiler house. The engine house is generally a one-story building, above ground, with a basement below. Vertical marine-type engines direct coupled to dynamos are usually adopted, which are erected on the ground floor. The steam turbine is now coming into use, which will probably take the place of the vertical engines in the future, where facilities for condensing exist. The switchboards are placed on galleries; the leads from the machines and mains leaving the station are arranged under these galleries. The condensing plant is generally in the basement. The boiler house usually contains horizontal water-tube boilers, arranged in one or two rows on two floors, with economisers and ash conveyers on separate floors. The coal store is over the upper boiler house. The boiler house is practically a five or six story building at least, for the conveyers occupy a floor to themselves over the coal store.

The power house of the Manhattan Railway Company, New York, erected 1900-1, is a very complete example of this practice [pl. xiv.]. It was designed by Mr. C. H. Pegram,

assisted by Messrs. W. C. Phelps and C. Wellesley Smith. It is located on the East River between Seventy-Fourth and Seventy-Fifth Streets.

It has a frontage of 115 feet to Exterior Street, which borders the river, the whole site being 204 ft. 4 in. wide, and 588 feet long on one side and 531 feet on the other. The station is designed for a maximum capacity of 100,000 h.p., and the ground is considered to be sufficient for future enlargement of 50,000 h.p. more. It supplies seven sub-stations. The building is a massive square structure, of skeleton steel construction, with fairly heavy enclosing walls. The base is of rose-coloured granite, the walling above flashed bricks of a prevailing brown tone, and a red-tiled roof. The windows have semicircular heads. They are all in the upper part of the building, and are 14 feet wide, 45 feet high, and spaced about 35 feet centres. The building is 66 feet from top of granite base to top of parapet. The windows being unusually large detract somewhat from the scale of the building, which is not so impressive as might be expected from its great size. The engine-room is 93 ft. 6 in. wide and 128 ft. 6 in. long, and 107 feet high from engine-room floor to skylight.

The engine foundations are more or less separate blocks, each 40 feet by 40 feet by 21 feet thick, and these blocks alone contain about 9,000 cubic yards of concrete.

There are eight engines, vertical marine type, direct coupled dynamos of a nominal rating of 5,000 k.w. with total overload capacity of 7,000 k.w., or 10,000 c.h.p. They are 42 feet high, and weigh about 889,000 lbs. The revolving part is 32 feet in diameter and weighs 370,000 lbs.

The boiler house is rather longer, being 104 ft. 2 in. wide and 128 feet high. The coal store has a capacity of 15,000 tons. There are four plain brick circular shafts with octagonal bases for a height of 73 feet; each is 17 feet inside diameter, and 278 feet high. The foundations are 33 feet by 33 feet, and rest on the solid rock. The boiler house stanchions carry a load of about 500 tons. Under them is a sub-base of cast iron bedded on the concrete. The stanchions are spaced about 20 feet centres in one direction, and 15 feet in the other. The steel is stressed in the lower part up to 13,500 lbs. per square inch of sectional area. The building contains about 6,000 tons of steel and iron construction.

These particulars give some idea of the size and weight of these structures, and the enormous forces at work in them. The special construction problem which this type of station presents, apart from the mere support of the great loads of and in the building, is the manner in which these heavy loads are disposed on the site. Nearly three-quarters of the whole load is concentrated on half the area, and the moving machinery and about a quarter of the total load on the other half. By this arrangement the effect of the vibration is vastly increased, and it is difficult to prevent it from being transmitted to a considerable distance beyond the building. On hard and solid rock this is not so noticeable, but on compressible or water-logged soils it is a serious matter. In some cases piles have been driven over the whole site, with the twofold purpose of increasing the supporting power of the subsoil and preventing it working out from under the foundations, and reducing the tendency to increase and transmit vibration. But this is an expensive way of dealing with it, and of doubtful durability.

The special conditions present render this design of station unsuitable for sites of which the subsoil is liable to consolidation when shaken, as is the case in many parts of Great Britain, especially round London, unless precautions are taken to prevent the consolidation being much greater under one part of the building than under another. To some extent this can be overcome by constructing vertical retaining walls below the level of the general foundations, but even this is not always successful with this combination of load and movement. It is expensive, and, taken in conjunction with the greater cost arising from placing plant on upper floors, it is probable that the purchase of sufficient additional land to accom-

moderate all the plant on one floor will be found much cheaper, especially as the shape and area of land in or near towns in this country are not restricted to the same extent as in America, and land can be acquired by compulsory purchase for central stations.

The Manhattan station is typical of central stations generally in one respect. It is built on a bad foundation, the gneiss bed rock bottom being deeply eroded by streams which formerly traversed it. It was therefore of unequal supporting power, which accounts for the apparently unequal strength and thickness of foundations. The plans would be misleading without this explanation. Large quantities of water are used in connection with the work carried on in central stations, therefore they are frequently erected on the banks of rivers and canals, where the subsoil is hardly suitable for such buildings and careful adjustment of the weight is necessary. Sometimes the subsoil is hard in places and yielding in others. In such cases foundations like those of Manhattan have been found suitable, but in very soft soils much waterlogged it is as a rule better to support the load on concrete floats proportionate to the weight, allowing somewhat more than half the load which would be taken for an ordinary building. A thick float of concrete all over the site is a common method of meeting the difficulty, both in English and German practice. It is a good plan on clay, but should be keyed on the underside on looser soils.

In Calcutta, where the soil is soft and compressible, the float system was successfully used by Colonel Crompton, who allowed a load of 1 ton per square foot without appreciable settlement.

At Amsterdam this method was adopted, the ground being first consolidated with piles, which were scientifically spaced in proportion to the load brought down at different points [pl. xi. and xi. A]. The heads of piles should be kept clear of the concrete, otherwise they are liable to rot.

The Waterside power station of the New York Edison Company, built in 1901 and located in First Avenue on the block between Thirty-Eighth and Thirty-Ninth Streets, and running to the East River, is a very similar building. The site is 272 ft. 6 in. by 197 ft. 6 in. This building stands on the hard and firm rock which underlies the greater part of the City of New York. It is very similar to Manhattan, with the large semicircular heads to the windows characteristic of American practice in these buildings. It is faced with red sandstone and yellow brick. It is also a skeleton steel structure.

The boiler house building is 76 feet by 267 ft. 10 in. by 148 feet high, and contains 56 horizontal water-tube boilers rated at 650 h.p. each, but said to actually develop 1,625 h.p. each. They are arranged in two rows on two floors. The engine-room is 115 feet by 267 ft. 10 in. by 136 feet high, and contains sixteen engines of the Westinghouse Machine Company type, direct coupled to sixteen General Electric 4,500 k.w. three-phase generators delivering twenty-five cycles alternating current at a tension of 6,600 volts. The revolving part weighs 130,000 lbs., the armature 125,000 lbs., and the bed-plate 20,000 lbs., the whole generator apart from the engine weighing 275,000 lbs. There are four circular steel stacks, each 17 feet internal diameter, 132 feet above roof, and 200 feet from grate surface of the lower boilers.

Steel stacks are now coming into use in Great Britain, and some particulars about those at Waterside may be useful. They stand on brick pedestals about 80 feet high, the shaft above being constructed with steel plates—

$\frac{5}{8}$	in. thick for 44 feet
$\frac{1}{2}$	" " 44 "
$\frac{3}{8}$	" " 44 "

The joints are rivetted. They are lined with firebrick 8 inches thick for one-third of the height, above that with red brick (ordinary good tough building bricks). The linings are

carried on rings of angle iron in independent sections 20 feet high. There is an air space of 4 inches between the lining and stack.

The system of constructing linings for shafts in sections in this way now meets with much favour in America both for steel and brick shafts, and has been used on some brick shafts in England and on the Continent. In brick shafts the sections are carried on projecting header courses at suitable intervals. Very careful and accurate adjustment of the spaces between the supporting courses is necessary, as different kinds of firebricks vary considerably in expansion. The average expansion of the core is about 6 inches in 100 feet. Unless great care is taken the expansion of the sections will inevitably break the joint at each oversailed course. As soon as the shaft is worked, the headers will be snapped off, and then the lining becomes just the same as an ordinary core built up from the bottom, but of course not so strong. This method of construction is said to facilitate repairs, but when once the supporting courses are broken, this convenience no longer exists. The consolidation in building cores must also be allowed for, as this, even with firebricks set as close as possible, often amounts to as much as $4\frac{1}{2}$ inches in 100 feet. In several shafts otherwise excellently built serious injury has arisen within a few weeks of being used from this point having been overlooked. What the final result will be cannot be stated at present, as the stacks have not been long enough in use to enable one to express a very definite opinion about them, but in some not five years old the horizontal joints are already broken through at intervals of about 20 feet for the lower 100 feet of the stack. In the case of a shaft recently shut down for repairs it was found that the difference in length of the lining when the shaft was in use was 9 inches in 97 feet.

The Kingsbridge power station of the Third Avenue Railroad Company of New York is one of the latest stations of this kind erected in America [pl. vi., vii.]. It was erected in 1900-1, and has a rated capacity of 72,000 h.p., and a maximum of over 100,000 h.p. The whole installation was designed by Westinghouse, Church, Kerr & Co. It occupies a site 350 feet long and 250 feet wide. It is very similar to Manhattan and Waterside, but is built on piles, and steam turbines are installed instead of vertical marine-type engines. The subsoil is a fine sharp sand, into which 15,000 to 16,000 oak piles 40 feet long were driven, spaced at 28 inches centre to centre. They were driven at the rate of about ten minutes each pile. Over the heads a slab of concrete, average 8 feet thick, was laid covering the whole site. The concrete was composed of one part of Portland cement to two of sand and four of stone. The maximum bearing weight on the foundation is 15 tons per square foot. The building is skeleton steel construction. The lower part of the walls is granite; the upper part is built with curtain walls carried on the steel frame, and is faced with red brick and stone dressings. There are four chimney shafts, each 12 feet internal diameter, 200 feet high.

The Americans have displayed great ingenuity in installing very powerful plant on sites of small superficial area; stations with plant on more than one floor are more common there than elsewhere. A remarkable instance is the Edison station at Philadelphia [fig. 5, p. 292], where the plant is installed in an eleven-story building, each department being placed on a different floor, one above the other. It is not, however, an arrangement which would be adopted in ordinary practice, if by any possibility it could be avoided.

A somewhat similar practice obtained at one time in Germany, but it was never carried to the same extent as in America. The station in the Luisenstrasse, Berlin, of the Berliner Elektrizitäts Werke, designed and erected by the Allgemeine Elektrizitäts-Gesellschaft about 1889, is an instance. In this station three 3,000 h.p. vertical marine-type engines directly coupled to two 250-280 volt continuous current dynamos are placed on the ground floor, eight horizontal water-tube boilers on the first floor immediately over them. The coal store

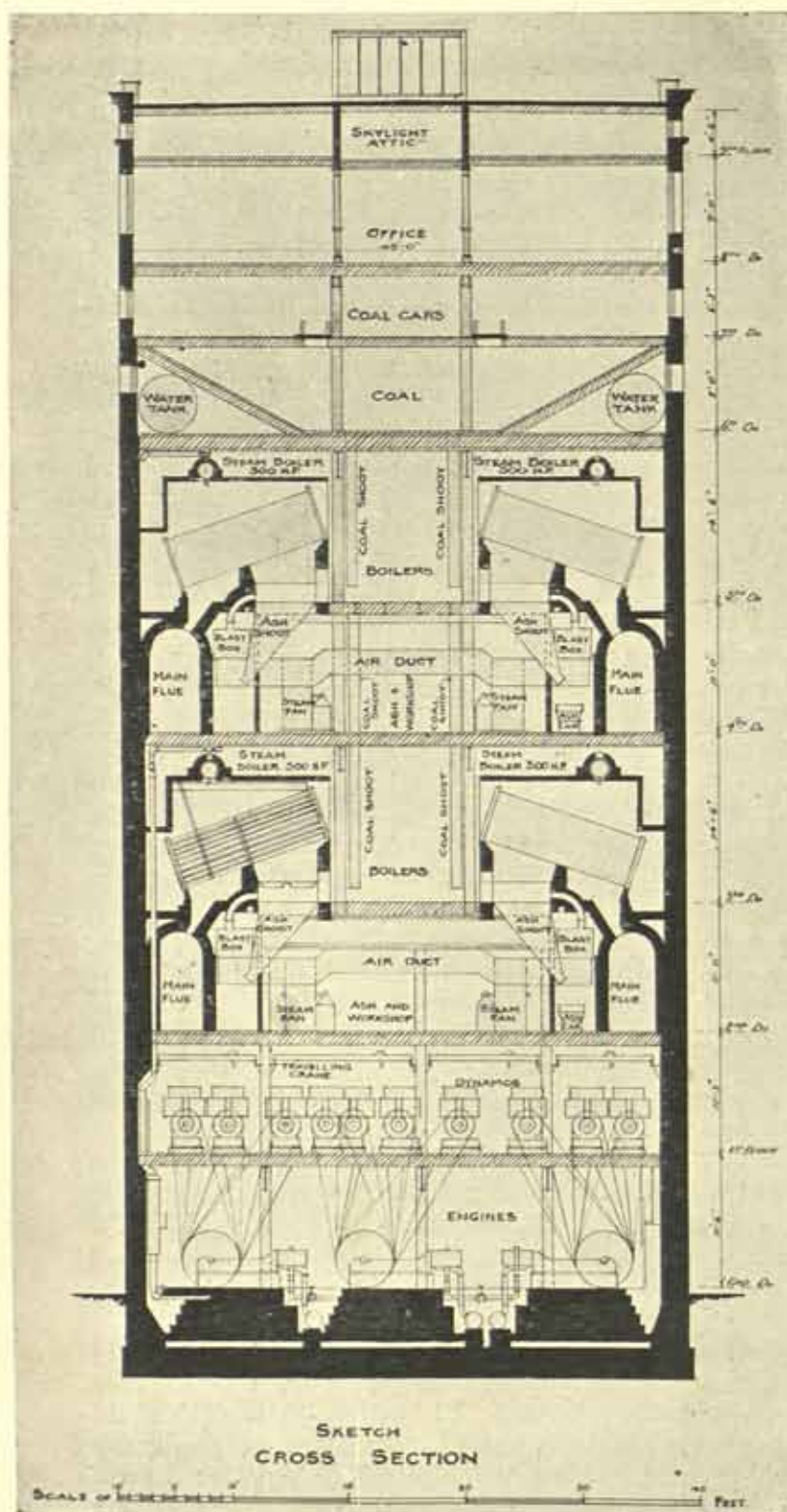


FIG. 5.—EDISON ELECTRIC-POWER STATION, PHILADELPHIA, U.S.A.

is on the top floor over the boilers. Although by no means a good arrangement, it is on the whole better than placing boilers in a basement below the level of the engines, which was a contemporary style now obsolete. The base of the chimney contains offices, but this also has not been successful, and should not be followed.

There are very few examples in Great Britain. The station at Bristol, designed by Mr. Parshall for the United Electric Tramways Company in 1899, is perhaps the most important. Its elevations, designed by Mr. Curtis Green, are alone sufficient to deserve careful study, apart from the skilful treatment of the engineering work [figs. 6 and 7, p. 293].

The present European practice inclines to the use of the horizontal engines directly coupled to dynamos with horizontal water-tube boilers, all plant placed at or about the ground floor level, and only the coal store being on an upper floor. Condensing plant and steam pipes are in the engine room basement. The latest stations in Vienna and Buda-Pesth of the Siemens Company, and Ober-Spree and Moabit, erected 1902-3, the great power stations of Berlin [pl. x.] and at Amsterdam, and the Hamburg power station supplying power for the docks, all stations designed by the Allgemeine Electricitäts-Gesellschaft, are on these lines.

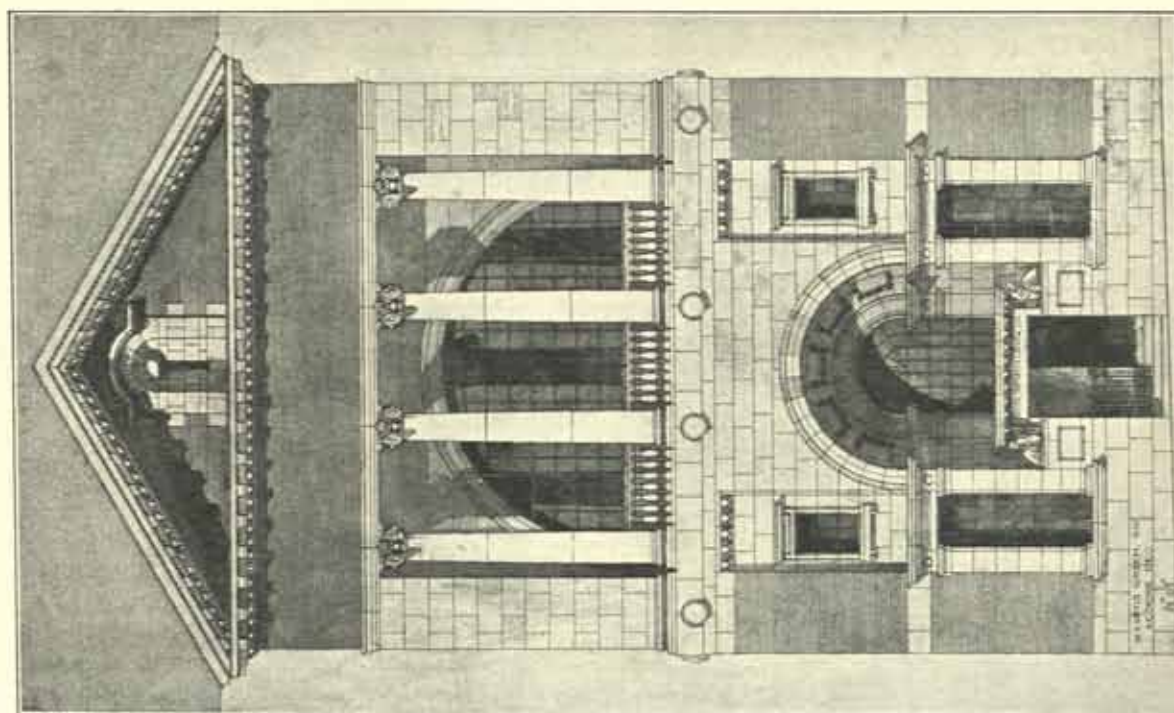


FIG. 7.—BRISTOL TRAMWAYS CENTRAL POWER STATION: FRONT ELEVATION.

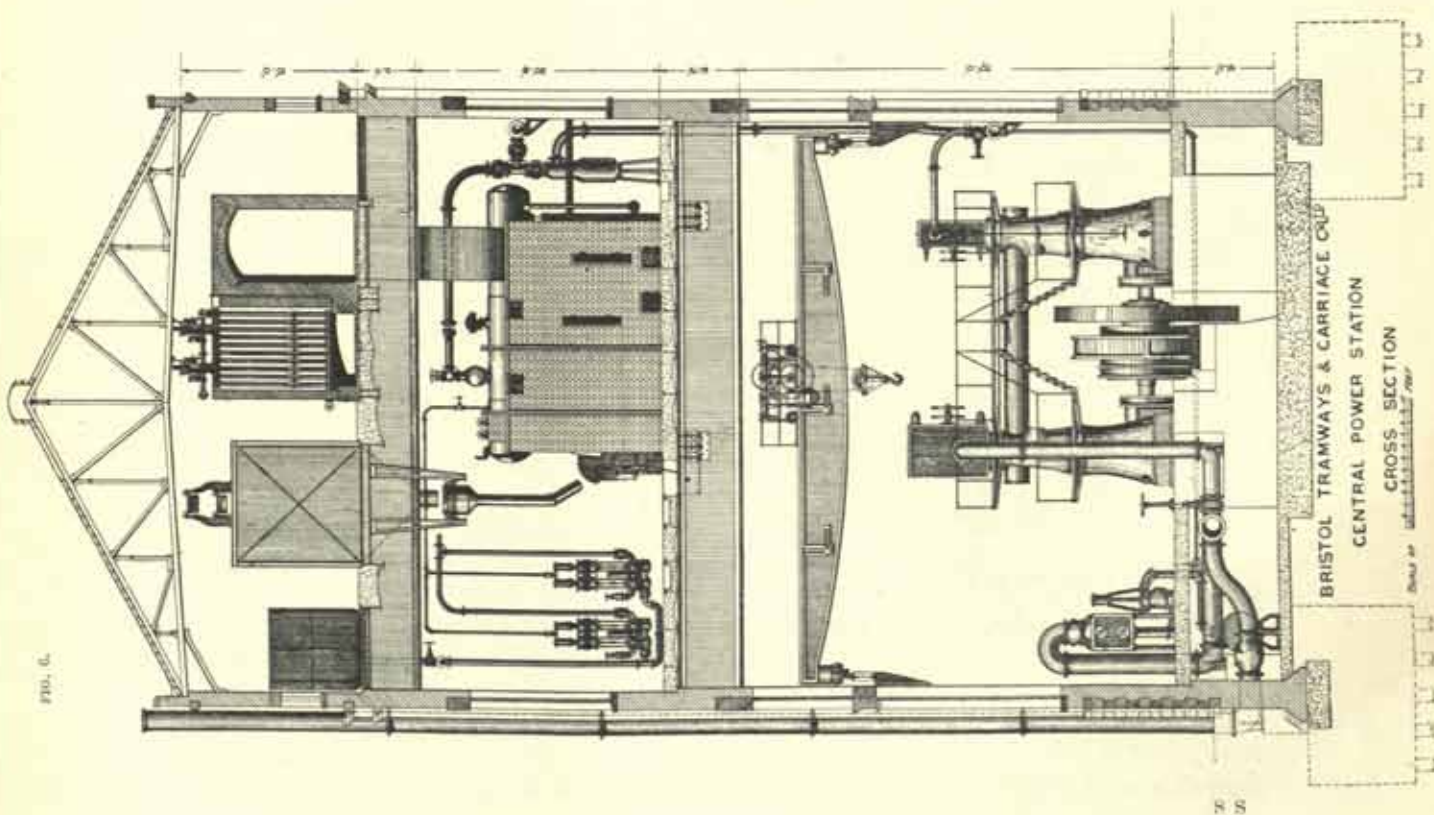


FIG. 6.

The Ober-Spree and Moabit Stations are equipped with horizontal engines of 3,500 and 6,000 h.p. each, direct coupled to dynamos generating energy at 6,000 volts. Each is intended to be a 50,000 h.p. station. The buildings are faced externally with fine hard bricks, bright buff, laid in the German fashion, all headers. The gable ends are well treated with very large windows and strongly marked divisions in the lights. The general wall-faces are plain, but the header bond gives an excellent scale to the buildings, and the ornament is concentrated in a few well-designed and well-placed features by which the full value of the expenditure on embellishment is obtained. This is a much more effective and suitable

treatment than expenditure on more expensive facing material, such as red bricks instead of ordinary building bricks, and the string courses and mouldings commonly used on what are called plain buildings. It is often said of buildings treated like Geneva, Munich, and the Berlin stations, that they are expensive. They are generally less costly than many buildings which look plain and are so described. The difference is that in the one case full value is obtained from the embellishments by good design, in the other case the same or greater expense is incurred for material not essential to construction frittered over the surface and therefore ineffective.



FIG. 8.—STEAM-POWER STATION, MUNICIPALITY OF MUNICH.

Of European central stations generally it may be said that the power station is rapidly superseding the direct supply station; but the older stations of Spain, Denmark, Greece, Belgium, Norway, and Sweden are still rather direct supply than power stations. The old station at Hamburg, in the Stadtmühlstrasse, may be mentioned as an uncommon arrangement, the engine room and battery rooms being one building, and the boiler house another, the steam pipes crossing under the street.

At the central station at Copenhagen there is a remarkably fine richly moulded and decorated timber roof over the engine room, of the usual Danish style. As a piece of carpenter's work it is both interesting and beautiful, but unsuitable for a central station. The central station is placed in the midst of a block of buildings, which is an undesirable position for a building of this kind. The roof is not only dangerous to the station, but also to the buildings round. It is fated to be burnt, unless soon removed, for timber in these buildings soon becomes as dry as tinder and highly inflammable. The engineer has realised the danger, and in the extensions of this station now in course of erection only incombustible materials are being used, similar to the construction now adopted in the best English and

foreign practice. The Russian stations, such as Moscow and Brakpan, are interesting in engineering details, but the buildings are unimportant.

Nearly every town of any size on the Continent now has a power station of some kind, and many extremely interesting buildings have been erected. The power station at Munich [fig. 8], with its interesting and original shaft [fig. 16, p. 310], the whole forming a most picturesque group with the baths which adjoin it. The station at Turin, with elegant gable treatment, and a circular brick shaft, well treated with pilasters and cornice at the top and plain brickwork below, partly water-power and partly steam, is an interesting example of Italian practice. At Vicenza, where a most ingenious arrangement of double arches and open tile-work is adopted for the windows.

As examples of effective interior treatment the station at Quedlinburg, in which the engine room is treated in plaster and brickwork, with black and white tile floor; Hof, in which the engine room is treated in brick and plaster, the latter decorated in colour, also with black and white tile floor; and Freiberg, as an example of simple and effective plaster treatment, may be cited. All these stations also exhibit much careful thought in the design of the elevations, which are in the characteristic style of the districts in which they are situated. They were designed by the Siemens-Schuckert Company. As an example of a somewhat elaborate Italian treatment the power station at Genoa, designed and equipped by the Allgemeine Company of Berlin, is interesting, and is indeed one of the finest stations in Italy.

Before leaving the subject of foreign power stations it is well to note that the arrangement of the plant substantially on one floor with coal store overhead is generally adopted wherever possible. The stations of the Detroit, Ypsilanti, Ann Arbor, and Jackson Railway, and at Grand Rapids for the Detroit Port Huron Railway, and the Toledo Fremont and Norwalk Railway, at Fremont, on the Sandusky River, all of the Westinghouse, Church, Kerr Company, are examples of this practice in the districts outside a city area in America.

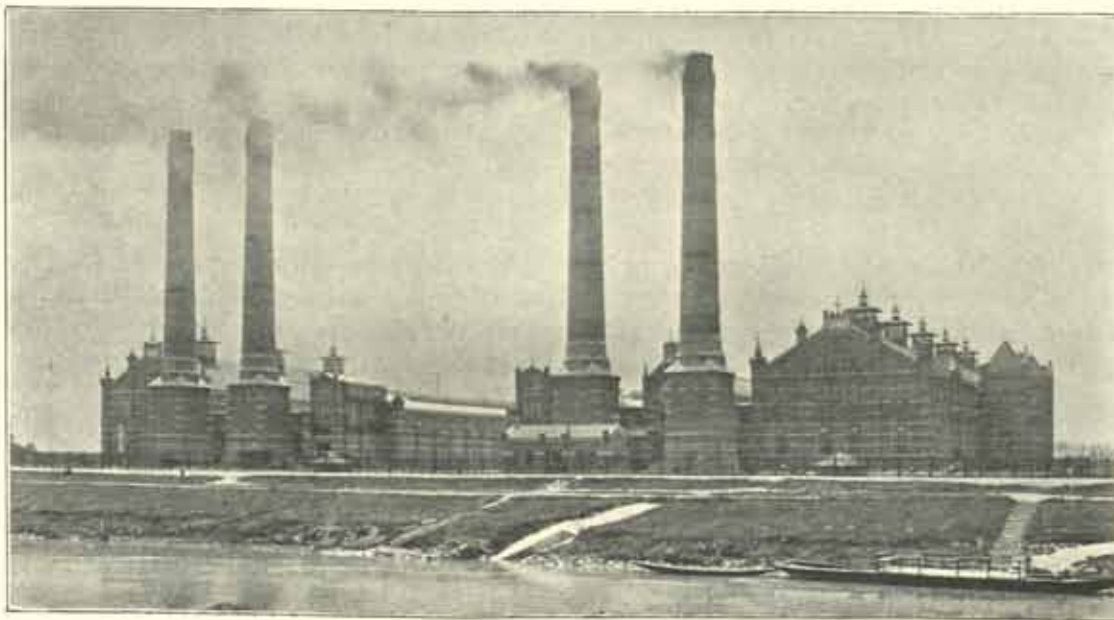


FIG. 9.—THE MUNICIPAL ELECTRIC POWER STATION, VIENNA.

The great power station of the Municipality of Vienna, designed and equipped by the Siemens-Schuckert Company, is one of the finest European examples [fig. 9, and pl. viii.].

Central stations without number could be cited did space admit, in which some novel architectural feature has been used as the direct outcome of the special requirement of the building.

Almost every combination and kind of plant and design of central station is to be found in Great Britain. This diversity of practice has added considerably to general knowledge about these buildings, but without thoroughly testing any type, as the uniformity of practice in other countries has done. Information collected from English practice is somewhat misleading, and false conclusions are often arrived at in consequence of being based on experience derived from one building, where perhaps exceptional circumstances have produced some result which is apt to be regarded as reliable, when in fact it is not. Many curious mistakes have arisen from this cause.

Some stations closely resemble American types, such as the power station now in course of erection on a site of $3\frac{1}{2}$ acres at Lot's Road, Chelsea [pl. iii.], in connection with the electrification of the underground railways of London. The station has been designed by Mr. J. R. Chapman, chief engineer to the company. It has a frontage of 1,100 feet to the Thames and Chelsea Creek, 824 feet to Lot's Road. The building is 433 ft. 6 in. long, 175 feet wide, and 140 feet high from the ground floor to apex of roof.

The engine-house is a two-story building, and the boiler-house is a typical five-story type.

The building is steel skeleton frame, with central division wall and external screen walls between main steel supports. The elevations are faced with Fletton bricks, with red terracotta and red brick dressings.

The engine-room is 445 feet long, 72 ft. 6 in. wide, and 80 feet high from basement floor to top of lantern. The basement is 20 feet high. It will contain ten Westinghouse horizontal steam turbines, running at a speed of 1,000 revolutions per minute, coupled direct to three-phase generators, the current being generated at 11,000 volts, $33\frac{1}{3}$ cycles. There is space in the engine-room for one additional machine half the size. The current is transmitted at this tension to twenty-three sub-stations. The switchboard is carried on three galleries at the north-east end; the condensing plant and steam-pipes are in the basement of the engine-room.

The boiler-house is 445 feet long, 96 feet wide, and 140 feet high from basement floor to apex of lantern.

The building is carried on heavy piers of masonry, carried down 29 ft. 6 in. below the basement level.

The boiler-house will contain eighty horizontal water-tube boilers, arranged in double rows on two floors, with automatic stoking. There are four circular brick shafts, each 19 feet internal diameter, 275 feet high. The foundations are 42 feet square, and the bottom of the concrete is 34 ft. 6 in. below the ground line. There are 2,200 cubic yards of concrete in each shaft foundation.

The coal store has a capacity of 15,000 tons, and it is estimated that 800 tons will be consumed daily.

The machinery will develop at normal load 76,500 h.p. (57,500 kilowatts).

The power station about to be erected by the Great Western Railway Company at Park Royal, near Acton, was designed by Messrs. Kennedy & Jenkin, consulting engineers, and the buildings by the architect's department of the Great Western Railway Company.

The site has an area of about twenty acres, with a frontage of 1,000 feet to Willesden Lane and 800 feet to Coronation Road. The present building is to be 260 feet long, about

100 feet wide; but it is contemplated that in the future it will be quite eight times this size.

The engine-house will be a one-story building, and the boiler-house one story high.

Skeleton steel framing will be used for the main construction, filled in with brick screen walls.

The engine-room is to be 120 feet long by 105 feet wide, by 50 feet high from the floor to top of lantern, with a basement 8 feet high. It will contain eight 1,200 i.h.p. Belliss three-crank vertical type engines, running at a speed of 250 revolutions per minute, coupled direct to Electric Construction Company's three-phase alternators, the current being generated at a tension of 6,500 volts, at which potential it will be transmitted to four sub-stations. The switchboard will be carried on a gallery at the east end.

The boiler-house is to be 140 feet long, 92 feet wide, 80 feet high from basement floor to apex of lantern. The bottom of the foundations will be 4 feet below basement floor, and rest on chalk subsoil.

The boiler-house will contain ten Babcock & Wilcox patent water-tube boilers, with self-contained super-heaters and automatic stoking. There is one octagonal brick shaft, 14 feet internal diameter, and the top 250 feet high above the level of the fire-bars. The foundations are 48 feet square by 9 feet thick, and rest on the chalk subsoil.

The coal store is placed over the boiler-house, and has a capacity of 8,000 tons. It is estimated that 150 tons will be consumed daily.

The machinery will be capable of developing about 10,000 h.p. (6,000 kilowatts).

Another important power station in connection with railways is that of the Metropolitan Railway now in course of erection at Neasden. The plant is all arranged on one floor; Westinghouse steam turbines directly coupled to generators of 3,500 k.w. each, giving energy at 11,000 volts, 3 phase $33\frac{1}{3}$ cycles per second, are being installed.

One of the largest power houses in London will eventually be that of the Central Electric Supply Company at Grove Road, St. John's Wood [see frontispiece and pl. i., ii.], which will supply power for general purposes for the west-end districts of London served by the Westminster Electric Supply Corporation and St. James's and Pall Mall Electric Lighting Company. It is situated on the banks of the Regent's Canal, the site being $7\frac{1}{2}$ acres in extent, all of which will eventually be covered with the buildings. Upwards of 150,000 h.p. can be placed on the site if the plant is arranged on the one-floor system. The one half of the first section has recently been completed, and provides accommodation for 14,800 h.p.

The steam generator adopted (of which each section will contain 28) is known as the Climax Boiler. It is a new kind of vertical water-tube boiler. It occupies a very small area of ground space, and has so far proved efficient.

The chimney shafts (there will eventually be six) are very prominent structures, and standing high can be seen for a considerable distance in all directions. Each shaft is 18 ft. by 18 ft. inside measurement at the top, 260 ft. high from top of concrete to top of cap. The main flues enter by three openings 60 ft. above ground level. In the architectural treatment of the upper part an attempt has been made to take advantage of the iron bands which sooner or later are required round the upper part of all shafts, and of the recesses formed, by placing the set-offs, when the brickwork is reduced in thickness, on the outside instead of the inside of the wall. By these means some relief is obtained, and the upper part is designed as an enriched feature which, in contrast with the plain wall below, forms the whole composition. It is possible that working on these lines some satisfactory and characteristic treatment of large stacks may be evolved. Similar principles have been followed in the general treatment of the principal façades. The flues are built of double casings of steel plates with air space

between them, and are carried outside above the roof of the boiler house, and are free to expand and contract. There will be four blocks of buildings. Each block will contain an engine room 110 feet by 224 feet by 66 ft. 6 in. high from engine room floor to top of lantern. This room will accommodate ten vertical high-speed engines direct coupled to dynamos of 2,400 h.p., three of 1,200 h.p., and three of 300 h.p., or 28,500 h.p. in all. The current is generated at a tension of 6,000 volts. The switchboard is on a gallery at one end of the engine room, which is continued round the room to give access to the high level platform of engines. The building is skeleton steel construction, with substantial external walls. Messrs. Kennedy and Jenkin and S. T. Dobson are the engineers, and Messrs. C. Stanley Peach and C. H. Reilly the architects.

The principal power station in Edinburgh is at McDonald Road, Leith Walk [fig. 10]. It was designed by Messrs. Kennedy and Jenkin, engineers, the Burgh engineer, Mr. Cooper, being the architect. The site has an area of three acres, with a frontage of 540 feet to McDonald Road. The present building is 270 feet long and 110 feet wide; but it is contemplated that in the future it will be quite four times this size.

The engine house is a one-story building, and the boiler house is one story high, with overhead coal bunkers.

Skeleton steel framing has been used for the main construction, filled in with brick screen walls. The elevation is faced with stone.

The engine room is 120 feet long by 70 feet wide, by 66 feet high from the floor to top of lantern, with a basement 8 feet high. It will contain eight 1,200 i.h.p. three-crank vertical Willan's engines, running at a speed of 230 revolutions per minute, coupled direct to

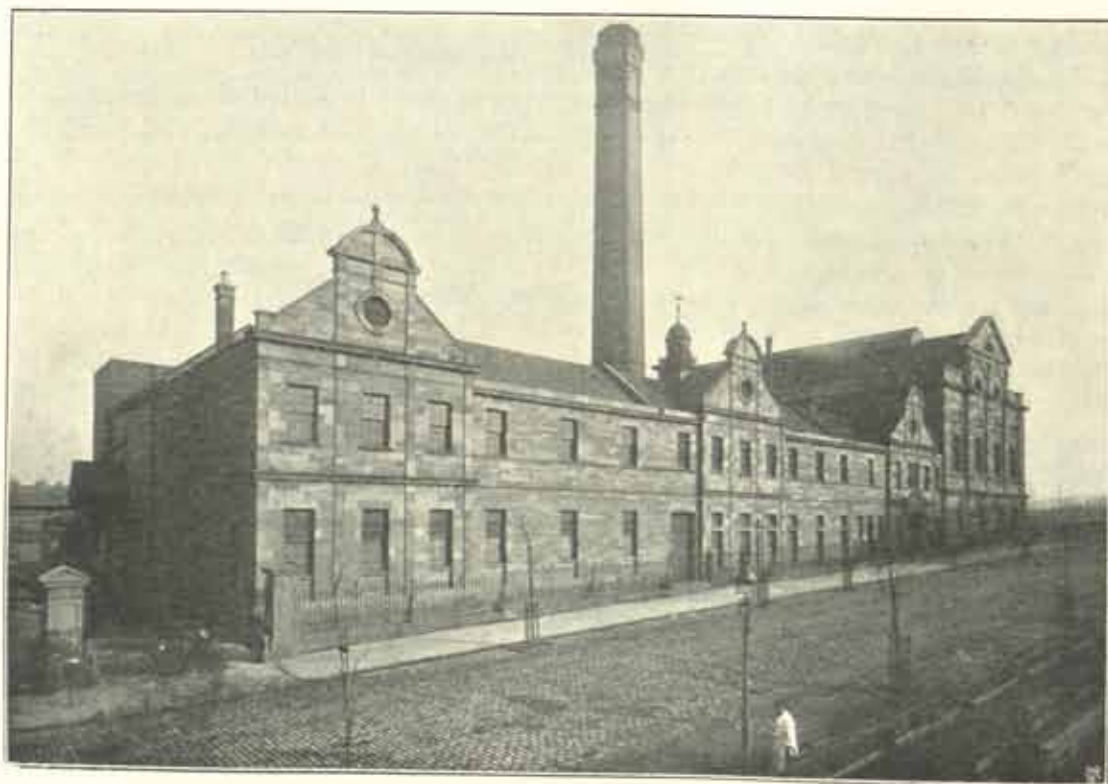


FIG. 10.—POWER STATION OF THE CORPORATION OF EDINBURGH, McDONALD ROAD, EDINBURGH.

continuous current shunt-wound Mather and Platt and Siemens dynamos, the current being generated at a tension of 480 volts. The switchboard is carried on a gallery at the south end.

The boiler house is 195 feet long, 60 feet wide, 44 feet high from basement floor to apex of lantern. The bottom of the foundations is 4 feet below basement floor, and rests on sand subsoil.

The boiler house contains 19 dry back marine type Sinclair and Stewart boilers, with automatic stoking. There is one octagonal brick shaft, 11 ft. 6 in. internal square, and the top 250 feet high above the level of the fire-bars. The foundations are 40 feet square by 8 feet thick, and rest on the sand subsoil.

The coal store is placed over the boiler house, and has a capacity of 1,300 tons. It is estimated that 60 tons will be consumed daily.

The machinery will be capable of developing about 10,000 i.h.p. (6,000 k.w.).

One of the principal power stations of the Corporation of Glasgow is at Port Dundas, opened in September, 1900. It is rather a direct supply than a power station. About one-third has been erected. It will eventually accommodate plant of 30,000 i.h.p. Mr. W. A. Chamen was engineer.

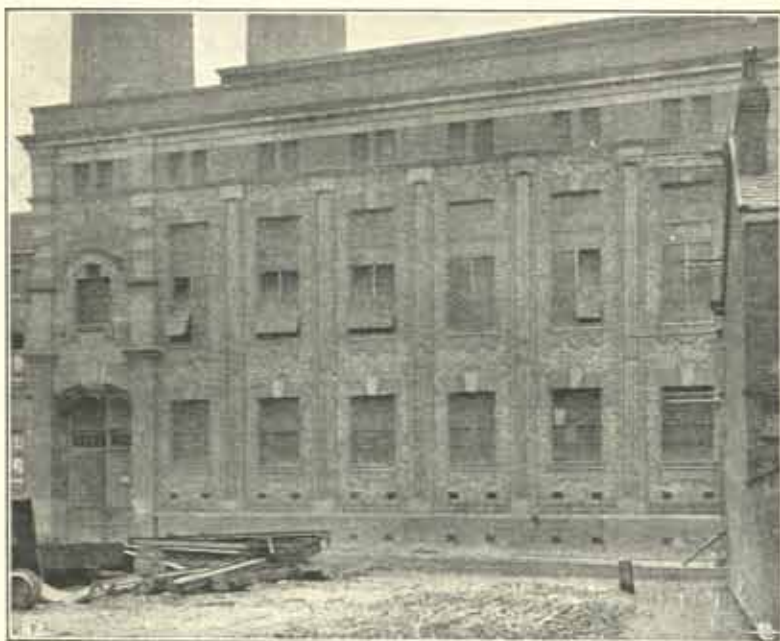


FIG. 11.—POWER STATION OF THE CORPORATION OF MANCHESTER, STUART STREET.

The principal power station of Manchester is situated at Stuart Street [fig. 11, and pl. iv.], and was designed by Messrs. Kennedy and Jenkin, consulting engineers, Messrs. C. S. Allott and Sons being the architects.

The site has an area of 8 acres, with a frontage of 550 feet to Stuart Street. The present building is 320 feet long, 140 feet wide; but it is contemplated that in the future it will be quite four times this size.

The engine house is a one-story building and the boiler house is two stories high, with coal store over the boilers.

Skeleton steel framing has been used for the main construction, filled in with brick screen walls. The elevation is faced with Ruabon bricks with stone dressings.

The engine room is 115 feet long by 130 feet wide, by 70 feet high from the floor to top of lantern, with a basement 12 feet high. It will contain six main 2,400 i.h.p. Yates and Shaw engines, running at a speed of 94 revolutions per minute, coupled direct to electrical three-phase alternators, the current being generated at a tension of 6,500 volts, at which potential it is transmitted to ten sub-stations. The switchboards are carried on four galleries at the west end.

The boiler house is 205 feet long, 92 feet wide, 64 feet high from basement floor to apex of lantern. The bottom of the foundations is 4 feet below the basement floor, and rests on clay subsoil.

The boiler house contains 24 Babcock and Wilcox patent water-tube boilers, with automatic stoking. There are two (octagonal) brick shafts, 12 feet and 16 feet square (inside), and the tops 200 and 250 feet respectively, above the level of the fire-bars. The foundations are 48 feet square by 9 feet thick, and rest on the clay subsoil.

The coal store is placed over the boiler house, and has a capacity of 700 tons. It is estimated that over 100 tons will be consumed daily.

The machinery will be capable of developing about 15,000 h.p. (9,000 k.w.).

A noticeable feature in the design of this building is the treatment of the steel construction. The main stanchions are not covered, but are exposed in the elevations; the brickwork between them being shown as a curtain, and treated as it really is, panel work between the main supports.

The power station of Sunderland is situated at Farrington Row, Hylton Road, and was designed by Mr. John F. C. Snell, Borough Electrical Engineer, who was also the architect.

The site has an area of three acres, with a frontage of 675 feet to Farrington Row. The present building is 167 feet long, 113 feet wide, 53 feet high from ground floor to apex of roof; but it is contemplated that in the future it will be quite three times this size.

The engine house is a one-story building, and the boiler house is one story high. The elevation is faced with Sherburn bricks, and with stone dressings.

The engine room is 164 feet long by 44 feet wide, by 45 feet high from floor to top of lantern, with a basement of 7 feet high. It contains eight triple expansion, surface condensing Belliss & Morcom engines, running at a speed of $3\frac{1}{2}$ revolutions per minute, five being coupled direct to Silvertown direct current dynamos, and three, each of 1,100 b.h.p. coupled direct to a.e.g. three-phase alternators, the current being generated at a tension of 5,500 volts, at which potential it is transmitted to four sub-stations. The switchboard is carried on a gallery situated at the east side of the engine room, in a position which will be ultimately central with the completed station.

The boiler house is 164 feet long, 63 feet wide, 49 feet high from basement floor to apex of lantern. The bottom of the foundations is 4 feet below the basement floor, and rests on boulder clay subsoil and magnesian limestone.

The boiler house contains eight Lancashire and Galloway 30 feet by 8 ft. 6 in. diameter boilers, with automatic stoking, superheaters, and Green's economisers.

There is also a motor-driven induced draught fan.

There is one octagonal brick shaft, 8 feet internal diameter at the top, 115 feet high above level of the fire-bars. There will ultimately be two such shafts.

The foundations are 28 feet square by 21 feet thick, and rest on the magnesian limestone subsoil.

The coal store is placed in the upper part and to one side of the boiler house, and has a capacity of 280 tons; it is estimated that forty tons will be consumed daily by present plant.

The machinery is capable of developing 5,200 horse-power (3,530 k.w.).

The power station of the County Borough of Brighton is situated on the south side of the east arm of Shoreham Harbour (Southwick), and was designed by Mr. Arthur Wright in conjunction with Mr. P. F. Lapworth and Mr. T. G. Otley.

The site has an area of over ten acres, with a frontage of 679 feet to Shoreham Harbour, and 719 feet facing on the beach.

The present building is 247 ft. 3 in. long, 229 ft. 6 in. wide, and 65 feet high from ground floor to apex of roof; but it is contemplated that in the future it will be about twice this size.

The engine house is a one-story building, and the boiler houses are also one story high. Skeleton steel framework has been used for the main construction, filled in with brick screen walls. The elevation is faced with red bricks with stone dressings.

The engine room is 220 feet long by 74 feet wide by 65 feet high from floor to apex of roof, with a basement 15 feet high. It will contain nine 1,800 k.w. steam turbines, running at a speed of 1,500 revolutions per minute, coupled direct to three-phase alternators, the current being generated at a tension of 8,000 volts, at which potential it is transmitted to the North Road sub-station, Brighton. The switchboard is carried on a gallery at the north end of the engine room.

The boiler houses are each 228 feet long, 73 ft. 10½ in. wide, and 50 feet high from firing floor to apex of lantern.

The bottom of the foundations of the structures is in some cases about 31 feet below the engine room floor, and rests on a blue clay subsoil.

The boiler houses will contain eighteen water-tube boilers, each having 6,000 square feet tube-heating surface, together with six superheaters (separately fired) all provided with mechanical stokers.

There are four circular steel shafts, each 6 feet internal diameter at the top, and about 100 feet high above level of the fire-bars, used in conjunction with induced draught fans.

The chimney foundations are 14 feet square by about 31 feet deep, and rest on the blue clay subsoil.

The coal store is placed over the boiler house, and has a capacity of about 3,000 tons; it is estimated that 80 tons will be consumed daily when all the plant is installed in the present first section.

The machinery will be capable of developing about 14,400 kilowatts.

The power station of Eastbourne is situated at Roselands Seaside, and was designed by Messrs. Brydges and Hawtayne, engineers, Mr. R. M. Gloyne being architect. The site has an area of 11,483 square feet.

The present building is 119 feet long, 96 ft. 6 in. wide, 52 feet high from the ground floor to apex of roof, and is about one-third of future size. It is a brick building of consistent fireproof construction throughout.

The engine room is 82 feet long, 35 feet wide, 45 feet high from the floor to top of lantern, with a basement 7 feet high. Five vertical engines, direct coupled to Ferranti and Electric Construction Company's dynamos, are at present installed. Energy is generated at a tension of 2,200 volts, at which potential it is transmitted to twenty-two sub-stations. The switchboard is placed on a raised platform at one end of the engine room.

The boiler house is 92 feet long, 42 feet wide, 46 feet high from basement floor to apex of lantern. It contains six boilers. The bottom of the foundations is 7 ft. 6 in. below the basement floor, and rests on blue clay.

The shaft is circular, 7 feet internal diameter at the top, 150 feet high above level of fire-bars. It is built of brick, and the foundations are on the blue clay.

The coal store is parallel with the boiler house.

The plant at present installed is capable of developing 2,000 h.p.

The power station of Liverpool is at Lister Drive. Mr. A. Bromly Holmes is engineer; Mr. T. Shelmerdine is architect.

The site has an area of $14\frac{1}{2}$ acres, the longest frontage, 650 feet, being to Lister Drive. Building No. 1 is complete, and is 248 feet long, 165 feet wide, and 62 feet high from ground line to apex of roof.

Building No. 2 will be 440 feet long; about half has been erected.

The engine room is a one-story building 224 ft. 9 in. long, 52 ft. 4 in. wide, and 58 feet high from the floor to top of lantern, with a basement 10 feet high. It contains twelve Willans and Robinson high-speed vertical engines, 1,200 h.p. each, 230 revolutions per minute. The dynamos are direct coupled to engines, and generate energy at a tension of 460 to 550 volts for tramway and lighting services. A portion is generated at 6,000 volts.

The switchboard is in a switch room at the front of the building.

Each boiler house is a two-story building 100 feet long, 51 ft. 7½ in. wide, and 56 feet high from basement floor to apex of lantern. Each boiler house contains fourteen Lancashire boilers with automatic stokers arranged in two rows with central stoking passage.

There are two octagonal brick shafts, 13 feet internal diameter at top, about 200 feet above level of fire-bars. The foundations are 35 feet square and 8 feet thick, and rest on hard red clay.

The coal store is over the boilers, and has a capacity of 1,000 tons. It is estimated that 200 tons will be consumed daily.

The present machinery is capable of developing about 14,400 h.p. (9,600 k.w.).

The buildings are faced with red pressed bricks with red stone dressings.

The power station of the Dublin Corporation is situated at Pigeon House Fort [fig. 12 and pl. v.], on a breakwater at the side of the harbour, $1\frac{1}{2}$ miles from the shore. It is a very complete

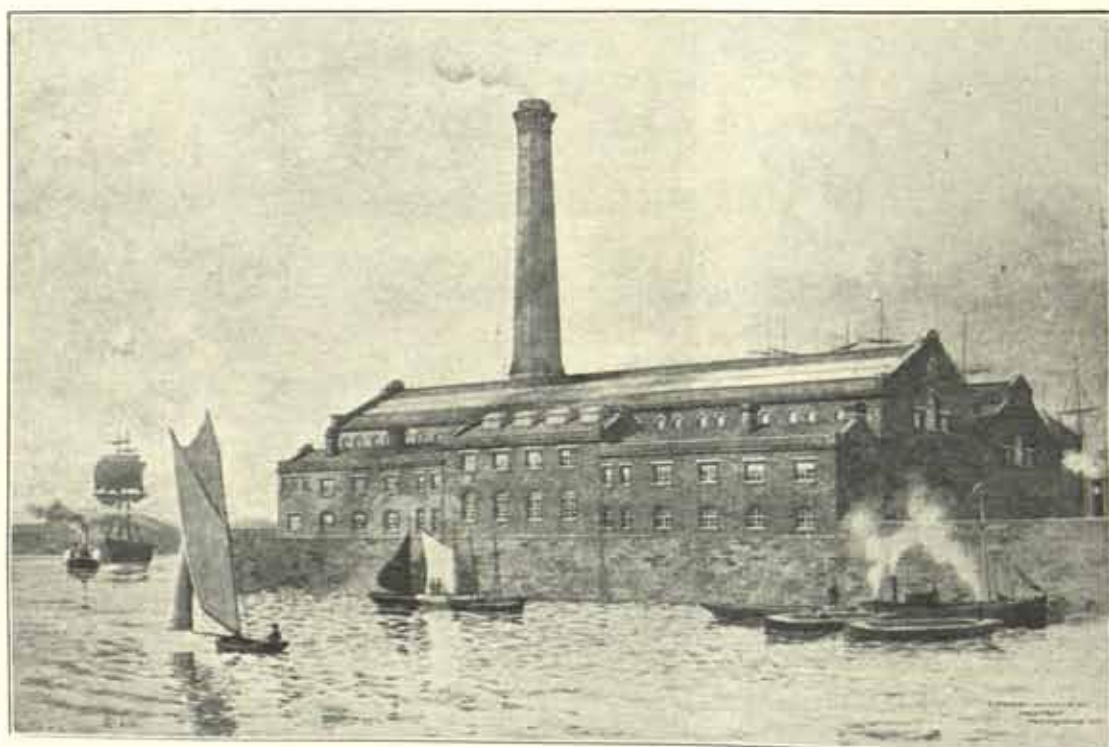


FIG. 12.—POWER STATION OF THE CORPORATION OF DUBLIN AT PIGEON HOUSE FORT.

station, with plant arranged substantially on one floor, with boilers back to back with the engines. There are six 30 feet by 8 ft. 6 in. Lancashire boilers (cylindrical), and four Babcock & Wilcox horizontal water-tube boilers, set in batteries of two each. The boiler house is fitted with mechanical stokers for feeding coal to the boilers from an overhead coal store, and a conveyor for removing the ashes. The boiler house is 153 feet by 53 feet by 31 ft. 6 in. from floor to springing of roof.

The chimney shaft is octagonal, standing on a brick base 20 feet square, constructed of brick. It is 186 feet high, with an internal diameter of 9 feet. The concrete foundation is 36 feet by 36 feet by 12 feet thick, resting on piles 24 feet long.

The engine room, which is 153 feet by 50 feet by 37 feet from floor to springing of roof, contains two Oerlikon 1901 pattern generating sets of 1,000 k.w., and two of 500 k.w. capacity, direct coupled to 820 h.p. vertical Corliss compound engines. The fly-wheels are 14 feet diameter, 28 inches wide, and weigh 29 tons, and run at a normal speed of 94 revolutions per minute. The current is generated at 5,000 volts, with a frequency of 50 cycles per second. The larger engines are a similar type, but 1,620 i.h.p.; the fly-wheel is 18 feet diameter by 2 ft. 6 in. wide, and weighs 40 tons, and runs at a normal speed of $83\frac{1}{2}$ revolutions per minute. It is a condensing station. The engineer is Mr. Robert Hammond; and Mr. Stephen Ayling is the architect.

Ringsend power house in Dublin belongs to the Dublin United Tramways Company, and is situated on the Grand Canal Basin, Ringsend, and supplies power for the tramways throughout the city. It is partly a direct supply station and partly a power station, supplying substations at Blackrock, Dalky, and Clontarf.

The electric current generated is three-phase, at a tension of 2,500 volts. There are at present 5 direct-current generators, and one three-phase generator in the station.

The building is 180 feet long by 160 feet wide, the engine room being 80 feet wide and 62 feet high from basement to roof, and 34 feet high from engine room floor to wall plate. The boiler house is 62 feet wide and 66 feet high inside measurements, and contains 20 Babcock and Wilcox boilers, arranged in two rows of ten each—twelve at present installed. The building is of skeleton steel construction enclosed with brick screen walls, the whole resting on concrete foundations. There is an overhead coal store of 1,500 tons capacity—mechanical stokers.

The chimney shafts are steel, brick-lined, 230 feet high, having an internal diameter of 10 feet inside the lining. Condensing plant in basement.

The switchboard gallery is 16 feet above the engine room floor. The engine room is designed to contain 10 units arranged in two rows. Of these, six are already installed. The engines are vertical cross compound Allis, having fly-wheels 19 feet diameter, and weighing 19 tons, running at 90 revolutions per minute, and are direct-coupled to General Electric Company's generators. Five are multipolar direct current type of an output of 550 k.w. at 90 revolutions per minute, with 50 per cent. overload. The sixth is a three-phase generator of revolving field type, also 550 k.w. at 90 r.p.m.

The station of the London United Tramways, at Chiswick [fig. 13], is a building of distinct individuality, and the elevations are impressive. The engineer is Mr. Parshall, Mr. Curtis Green the architect.

The power house is 154 feet by 106 feet, and both engine room and boiler house are faced externally with red brick and Portland stone, and internally with glazed bricks. Steel shaft 300 feet, and 10 feet internal diameter inside the fire-brick lining. It stands on a cast-iron base plate, supported on a pedestal of red brick with Portland stone dressings. The flue enters 30 feet above ground.

The power station of the City of London is situated on the south side of the Thames,

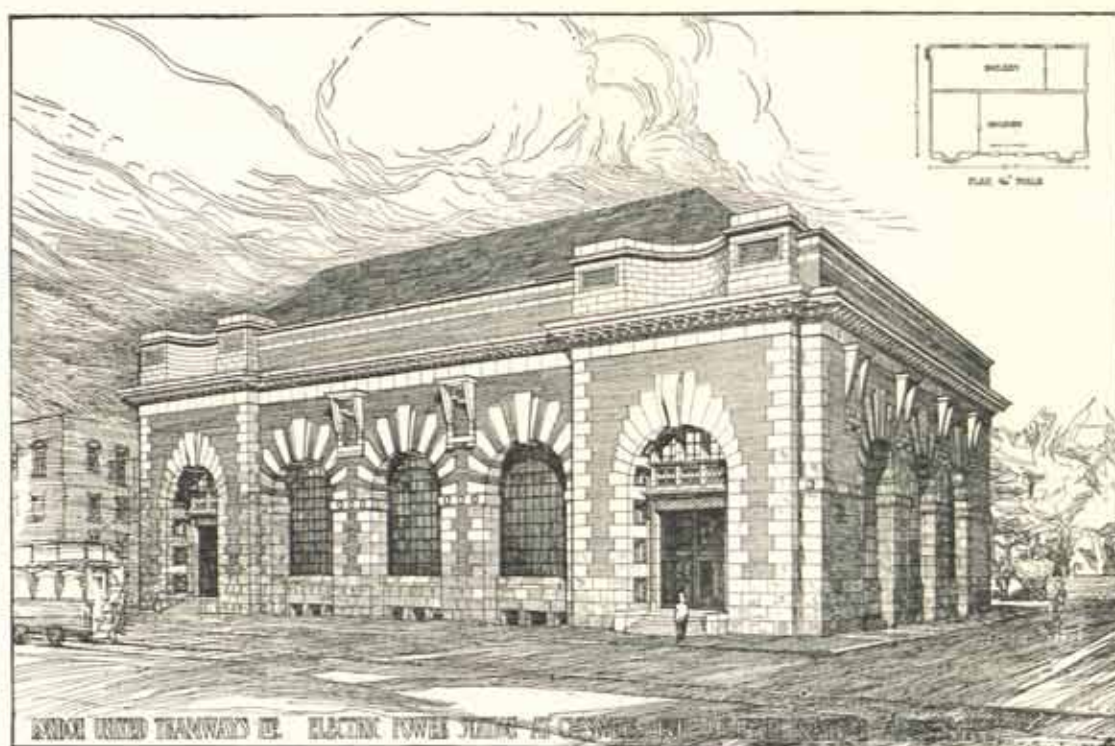


FIG. 12.—CHISWICK ELECTRIC-POWER STATION.

close to Blackfriars Bridge. The erection was commenced in 1892, and several enlargements have been made since. It is a very remarkable and interesting station, of over 14,500 h.p., but is unique in so many respects that no short description is possible. It is very fully described in the *Electrical Review* of March 3, 10, and 17, 1899, and February 28, 1902. There are three engine rooms, two boiler houses, and three shafts. It is partly a power and partly direct supply, but is in every way a notable example of a large installation. Although the land is extremely valuable, the one-floor arrangement has been adopted, which has proved both convenient and economical in working. It was designed by Mr. Frank Bailey.

There are numbers of other steam power stations, all presenting many features of interest, but the examples described are sufficient to indicate the general features of this class.

DIRECT SUPPLY STATIONS.—SIMPLE.

The simple direct supply station consists of the machinery departments somewhat on the same lines as the power station, of which it was the forerunner.

The Mason's Yard Central Station of the St. James's and Pall Mall Electric Light Company, Limited; Manchester Square, of the Metropolitan Electric Lighting Company; Chapel Place, of the Kensington and Knightsbridge Electric Light Company; Wandsworth, of the County of London and Brush Provincial Electric Lighting Company; the Central Stations of Battersea; Shoreditch (Whiston Street); of the respective Borough Councils, and the station

of the London County Council on the Thames Embankment, amongst many others, are examples of this class in London.

It was almost the earliest form of station, and originated simultaneously with the composite form of direct supply station. It was required in those districts which were too large to be served by one central station, before the days of the power station. It is not probable that many more of these stations will be required. Some of the existing simple direct supply stations are already being converted into sub-stations, and in time, no doubt, the steam plant will be taken out of many, and be replaced with electrical machinery only.

The Continental stations of this class are in many respects so similar to English examples that no detailed description is necessary; but the construction and elevations naturally possess the architectural features of the country to which they belong. As a comparatively obsolete class it would serve no useful purpose to give fuller particulars about them.

DIRECT SUPPLY STATIONS.—COMPOSITE.

Of the composite type of direct supply stations numbers exist all over the world. In small towns, in the country remote from other towns or from centres where power can be generated under exceptionally favourable conditions, and in agricultural districts, no doubt many of this type will be erected for some years to come. Sooner or later, however, combination between towns and districts will take place, and co-operative power stations will replace this class also, and those then existing will become at any rate partly sub-stations also. It will be a great advantage to this country in the keen war of trade competition which is before it, and will reduce the appalling extravagance and waste of the mineral wealth of this country which is now going on from the unnecessary consumption, carriage, and handling of coal, and all the attendant waste of land, labour, and time, and congestion of traffic produced and fostered by present methods. Unfortunately, the day has not yet come, and so composite stations will still be wanted, and a few notes on them will be useful.

They are in fact complete electrical works generating and distributing energy and include accommodation for all departments connected with the industry.* A complete composite station contains the following accommodation:—

Machinery Department.—Engine house, for engines, dynamos, switchboard, leads from dynamos and mains leaving the station, condensing plant, watch engineer's office, and accommodation for engine room staff and drivers. Workshop, oil and waste stores, engine room stores.

Electrical Storage Department.—Battery-room and stores.

Steam Department.—Boiler house and overhead coal store, economiser house, chimney shafts, pump room, and feed tanks. Accommodation for stokers, mess room, dressing room and lavatories, w.c.'s, &c., boiler house stores. Coal siding and elevator and conveyor, and hoist and truck way.

Water Department.—Similar to the power stations.

Tramways Department.—Car shed, painting shop, workshop in common with the machinery department, sand store, lamp room, car drivers' room, mess room, dressing rooms, lavatories, and w.c.'s for tramway staff.

In some cases where condensing water is not drawn direct from the river, cooling and water-softening plant is generally installed.

* Plans and sections of many of these stations are exhibited. Among them Hackney and Islington, of the Borough Councils of these parishes; Ipswich, Kilmarnock, Kirkcaldy, Harrow, Calcutta.

Public Health Department.—Destructor for town refuse connected to same stack as electricity works. The steam generated therein is used for warming buildings or other small and unimportant work. It has not proved very successful as a steam generator for large engines.

Outside Mains and Public Lighting.—Cable stores, building materials stores, ladder and truck stores, arc lamp stores, general stores, and yard. Tools and plant stores, carpenter's shop, smith's shop and forge. Accommodation for workmen.

Meter Department.—General workshop, clockmaker's shop, tested meter stores, battery and meter testing room, calibrating room, photometer room, control offices, accommodation for staff.

Administration.—General public offices, board room or committee room, offices for general managers, accountant, collectors, meter clerks and readers, chief engineer's drawing office, lavatories, &c. for staff. Each department would require a timekeeper's office, but this can in many cases be combined for several. Sometimes a residence for engineer.

The accommodation, of course, varies in nearly every case, but this table of accommodation gives a general idea of the buildings constituting a central station or electricity works of this class.

A very complete station of this class has recently been erected by the Corporation of Ipswich [pl. xix., xx.], and there are many fine examples in the provinces.

In the full description of power stations many points applicable to central stations generally have been noted. These apply in a great measure to direct supply stations also. Within the limits of these notes it is not possible to give further details of this class.

SUB-STATIONS.

Sub-stations to accommodate static transformers have been in existence for many years. They were formerly small unimportant structures, frequently vaults under the pavement or roadways, or in basements of houses. The modern sub-station, however, is a very different thing. It is a building requiring careful design and of daily increasing importance. The function of the plant installed in it is either to alter the character or to reduce the tension of energy derived from the power stations, and to distribute either the same energy at another potentiality or to generate and distribute new energy at low tension by means of dynamos directly coupled and driven by motors. These compound machines are called motor generators.

It may be said that these stations use electricity as the source of power, but obtain it at present in an indirect manner. From the architect's point of view it is not very material whether the current flows through the machines and is transformed, or whether it is actually generated by motors driving dynamos. In ordinary running, motor generators do not cause much vibration; under certain conditions, however, very severe vibration is set up, but it is an accidental rather than a normal condition. Some types produce a peculiar and penetrating note.

A sub-station without batteries consists of one principal room in which the motor generators are placed, also the switchboards regulating the incoming and the outgoing currents, and the subways or chambers for the mains into and out of the building. An office for the engineer in charge and on duty, and lavatories and conveniences for staff, and some space for stores. The switchboards are usually placed on galleries.

The sub-station at Bennett Street, Manchester; Duke Street, Mayfair, London [figs. 14 and 15, and pl. xii].

The addition of a battery makes a considerable difference to the design, as the batteries are often very large and require considerable room. Sometimes the building is only one story high, as sub-station No. 6 of the Manhattan Railway Company, which is a common type of American design; or it is a building of several floors, a more common Continental practice. The sub-station of Vienna of the Siemens-Schuckert Company; the sub-station Königin

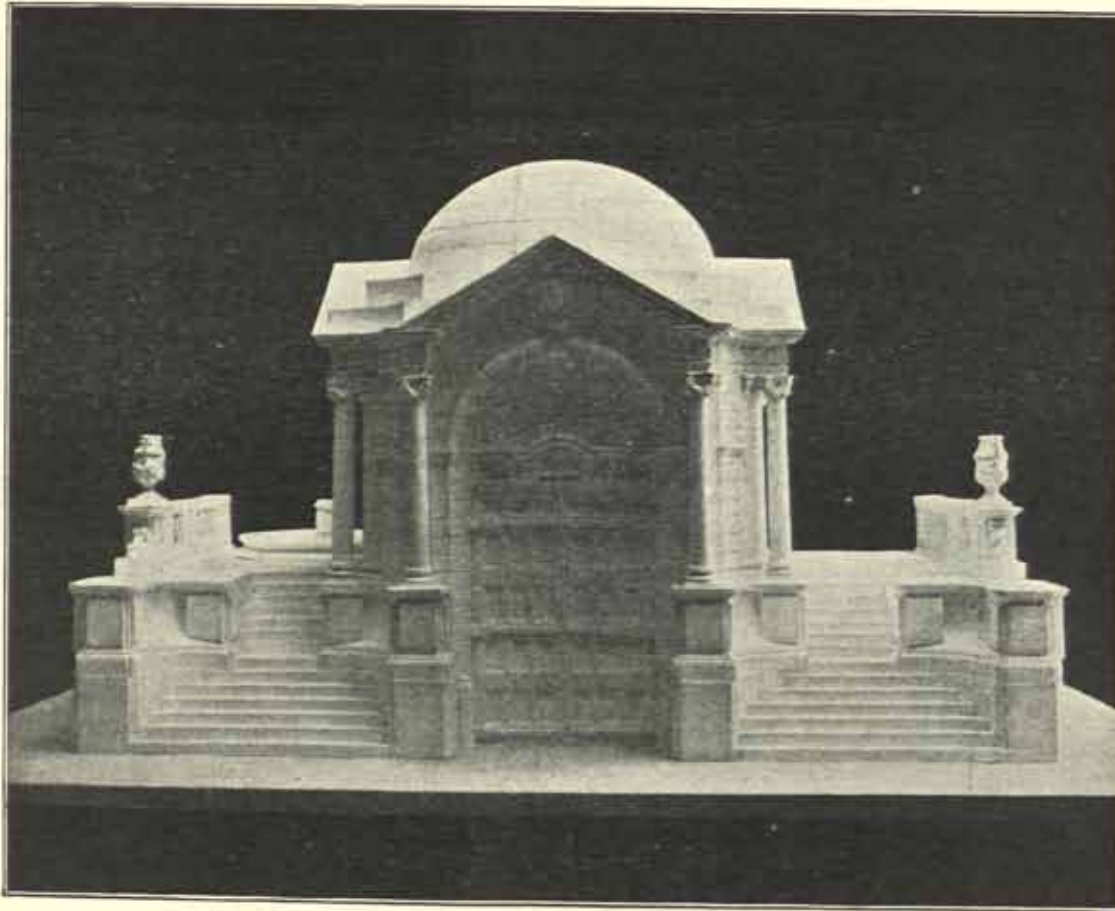


FIG. 14.--MODEL OF THE ENTRANCE PAVILION OF THE 14,000 H.P. SUB-STATION OF THE WESTMINSTER ELECTRIC SUPPLY CORPORATION, LTD., DUKE STREET, MAYFAIR, LONDON.

Augustastrasse at Berlin of the Allgemeine Company; the Albert Hall station of the Kensington and Knightsbridge Electric Light Company, one of the first in London, of which Mr. H. W. Miller was the engineer, are a few examples.

Sub-stations must be placed fairly near the centre of the area which they supply. Sometimes they must be erected in fashionable quarters, in residential districts, or close to important buildings. Every precaution should be taken to prevent transmission of mechanical vibration, or escape of sound beyond the building. The buildings must be dry, well ventilated, and well lighted in every part. In many cases the amount of energy required for the district to be served by the sub-station can be closely estimated before the building is erected.

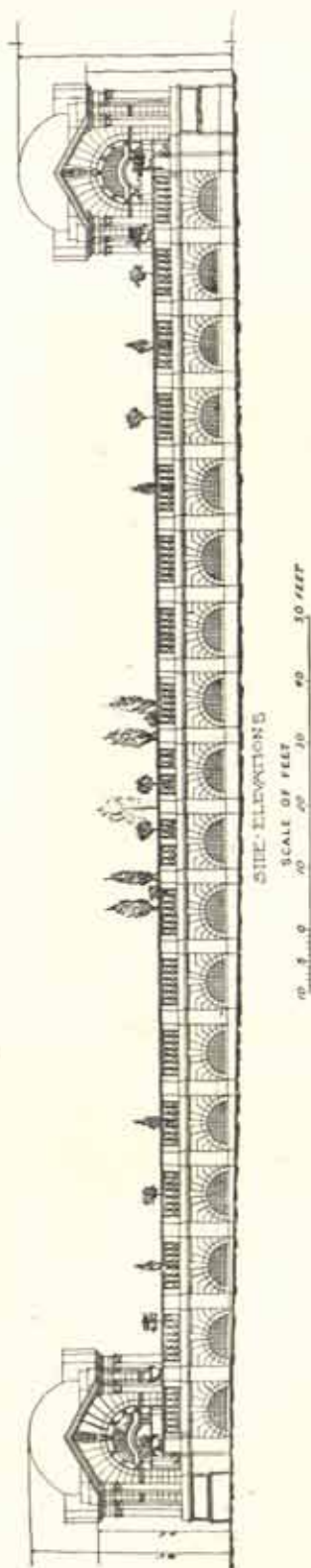


FIG. 15.—WESTMINSTER ELECTRIC SUPPLY CORPORATION, LTD.: ITALIAN GARDEN AND MOTOR GENERATOR STATION, BUCK STREET, MAYFAIR, W.

They will therefore generally be erected of full size at once, instead of being constructed as small buildings in the first instance adapted for enlargement in the future, as other central stations necessarily must be. To some extent this simplifies the design, but as these stations are of comparatively recent origin the kind of building likely to prove most suitable is not so well known, and present practice will no doubt be considerably improved. Hitherto they have been fairly small buildings, from 1,000 to 10,000 h.p., but they will probably be much larger in the future. Already sub-stations of 15,000 to 25,000 h.p. are projected, and some of this size are in course of erection. In future stations switchboards will perhaps be almost part of the structure, and the mains chambers will be separate from the machinery rooms. Indeed, more complete separation and greater space for mains than is usually allowed in this most important department are desirable in almost all classes of central stations, for there is no doubt that the switchboard is the most dangerous part of the installation.

Notes on central stations would hardly be complete without some reference to the chimney shafts. So important are these structures, and so interesting many details concerning them, that many pages would not exhaust all that should be noted about them. The breakdown of a shaft completely disables a central station, therefore there should not be less than two, and each should be capable of doing more than half the work of the station (or the division of the plant which it serves), so that, in case of necessity, one could, by being overworked for a time, take up a considerable portion of the work performed by the other shaft under normal working conditions.

These shafts are not ordinary factory chimneys. Their importance to the undertaking, and consequently to the community, their great size, and the fact that they may be erected in groups of from two up to six or more, require that they should be of better construction and appearance than is often deemed sufficient. If an ordinary factory chimney, creating draught for perhaps 1,000 or 1,500 h.p., is disabled, one factory is inconvenienced or perhaps stopped for a few days while some temporary arrangements are made. But temporary arrangements to replace a 15,000 or 20,000 h.p. stack would take a considerable time; meanwhile the work, light, and traffic of a whole district might be completely disorganised.

Many things are accepted as reliable facts about chimney shafts which rest on no better foundation than oft-repeated statements of workmen. It is a common belief that chimney shafts oscillate in a gale, and that if they do not they are deficient in elasticity, and are likely to be blown down. The results of actual measurements and observations of some hundreds of chimney shafts prove that they do not oscillate or sway, and

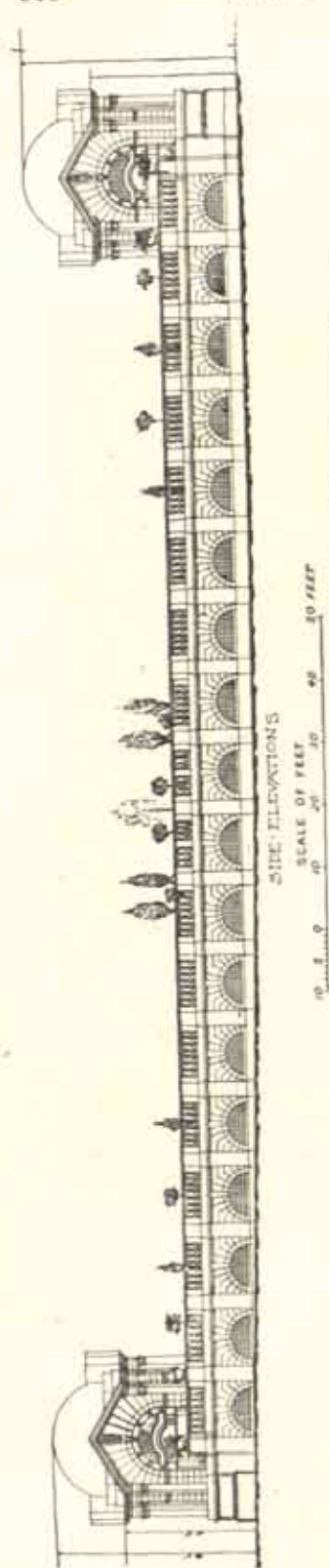


FIG. 15.—WESTMINSTER ELECTRIC SUPPLY CORPORATION, LTD.; ITALIAN GARDENS AND MOTOR GENERATOR STATION, DUKE STREET, MAYFAIR, W.

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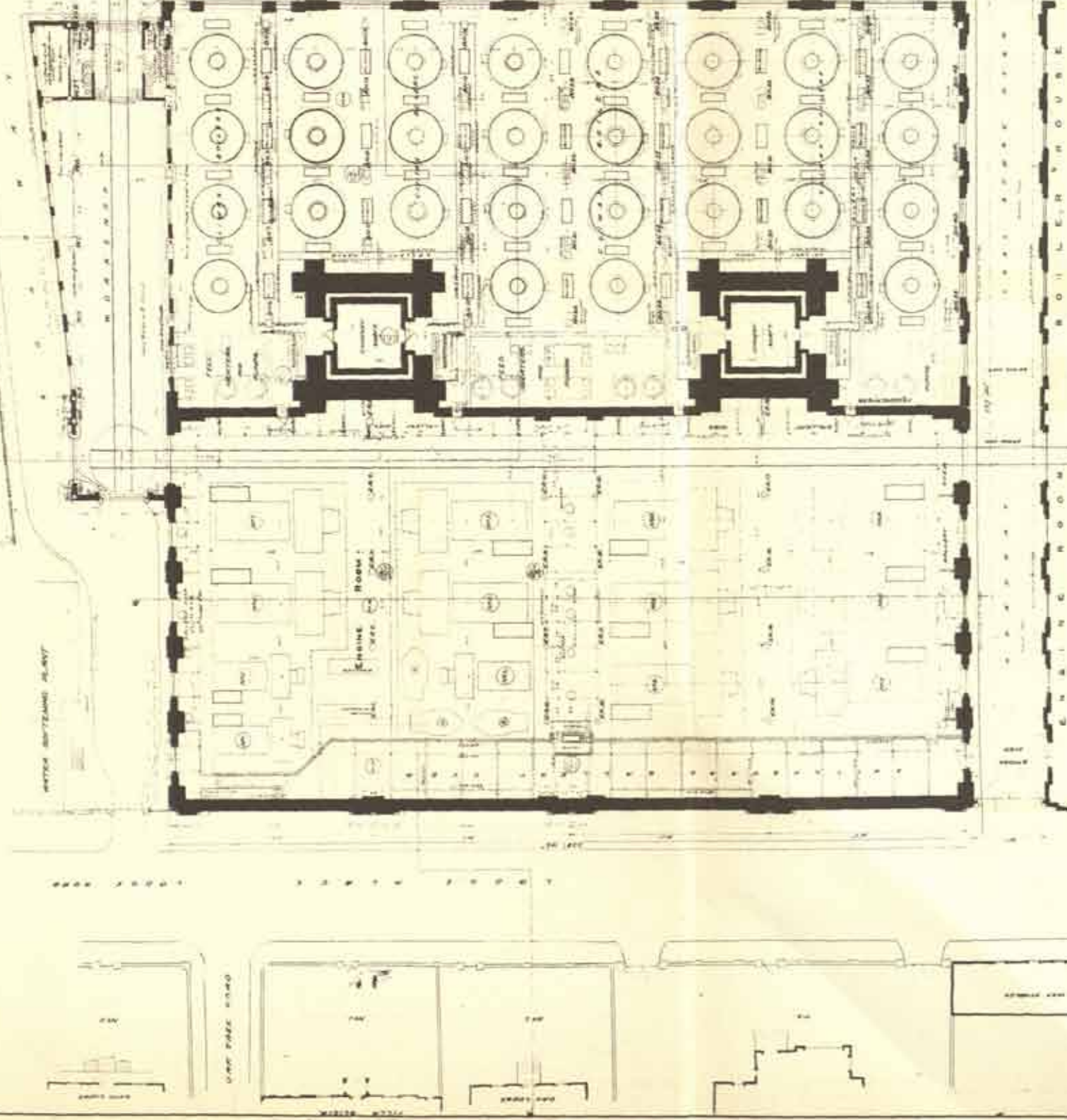
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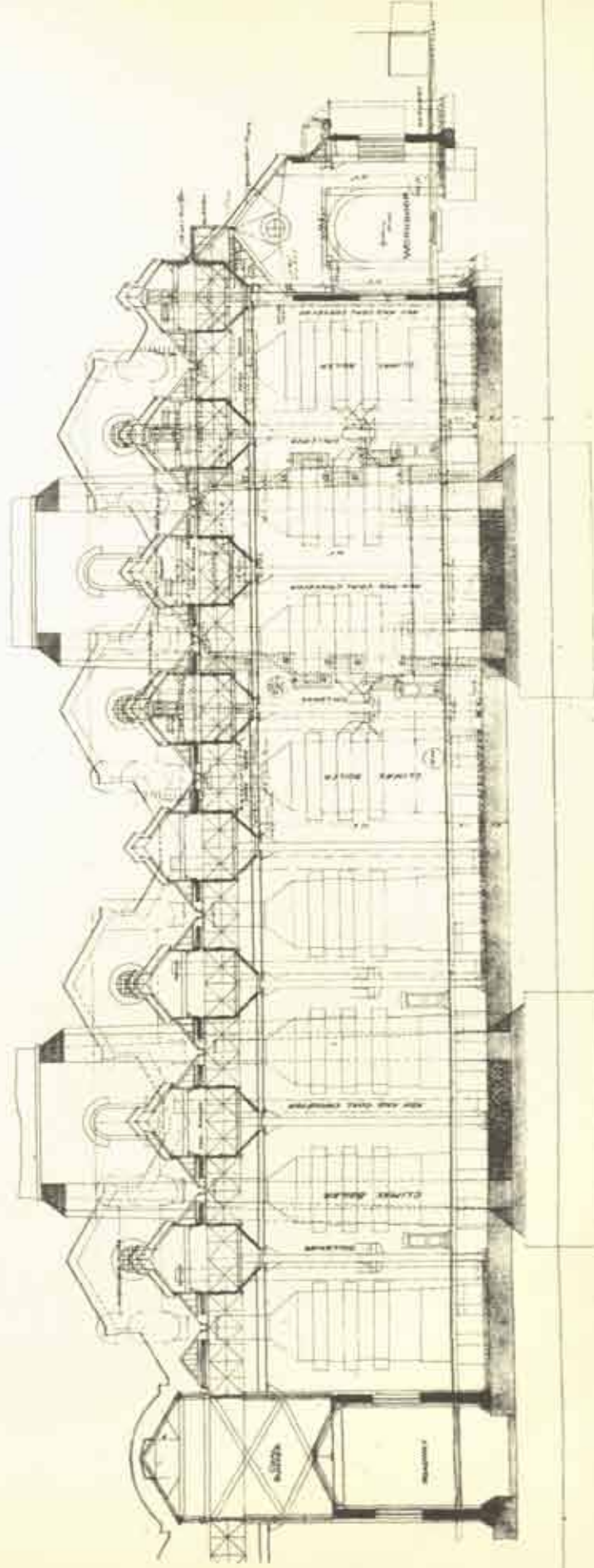
THE CENTRAL ELECTRIC SUPPLY COMPANY LIMITED.
GROVE ROAD STATION, MARYLEBONE, N.W.

GROUND FLOOR PLAN.



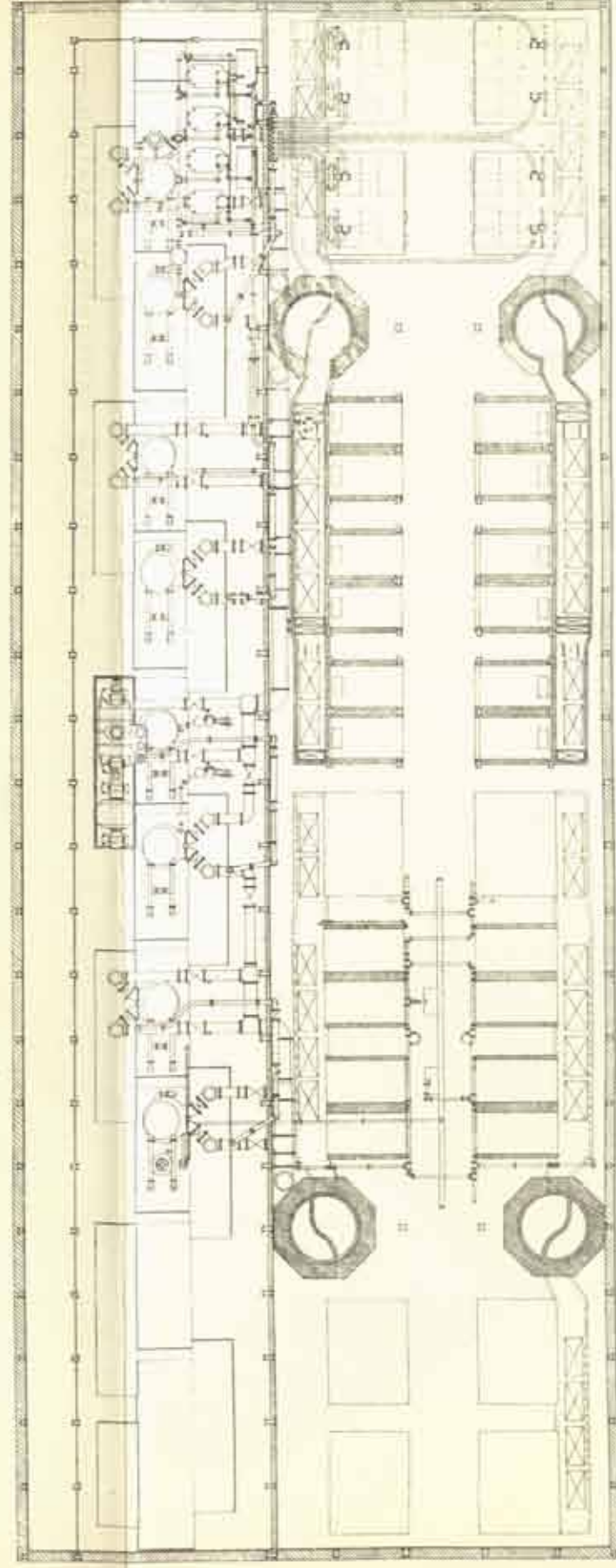
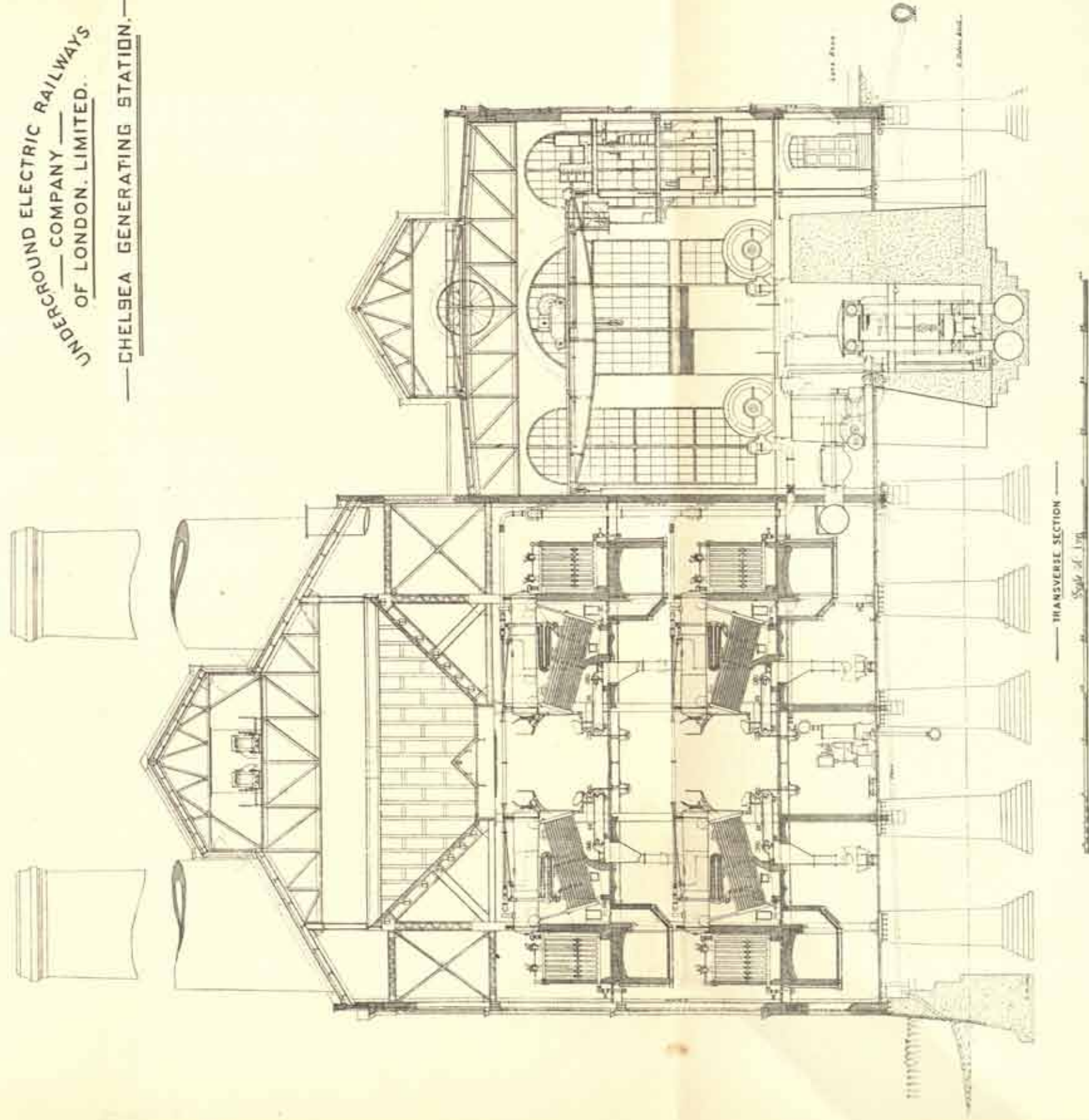
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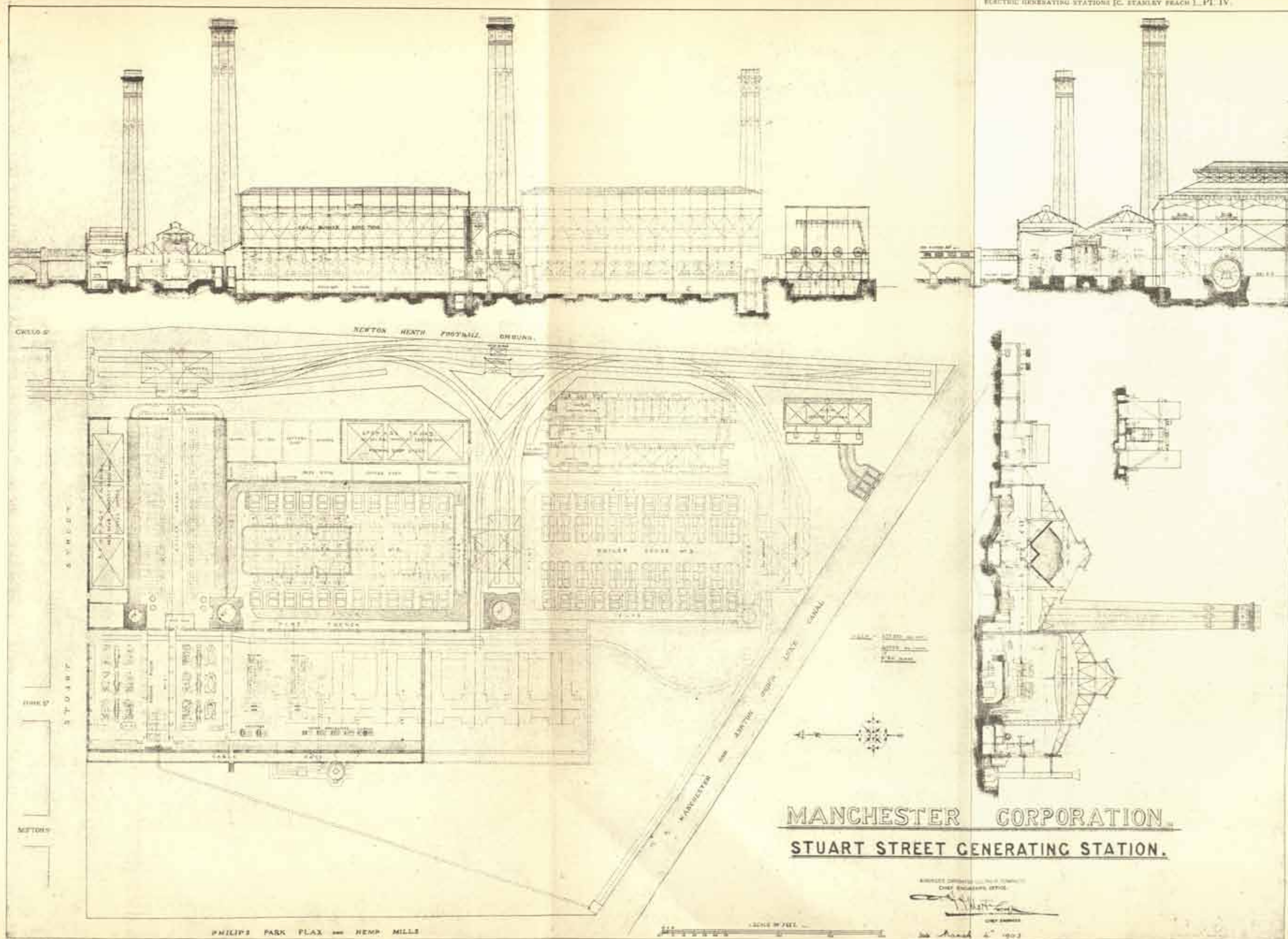
C. STANLEY PEACH, F.R.I.B.A.
Architect, 10, Abchurch Lane, London, E.C. 4.



TRANSVERSE SECTION THROUGH BOILER HOUSE

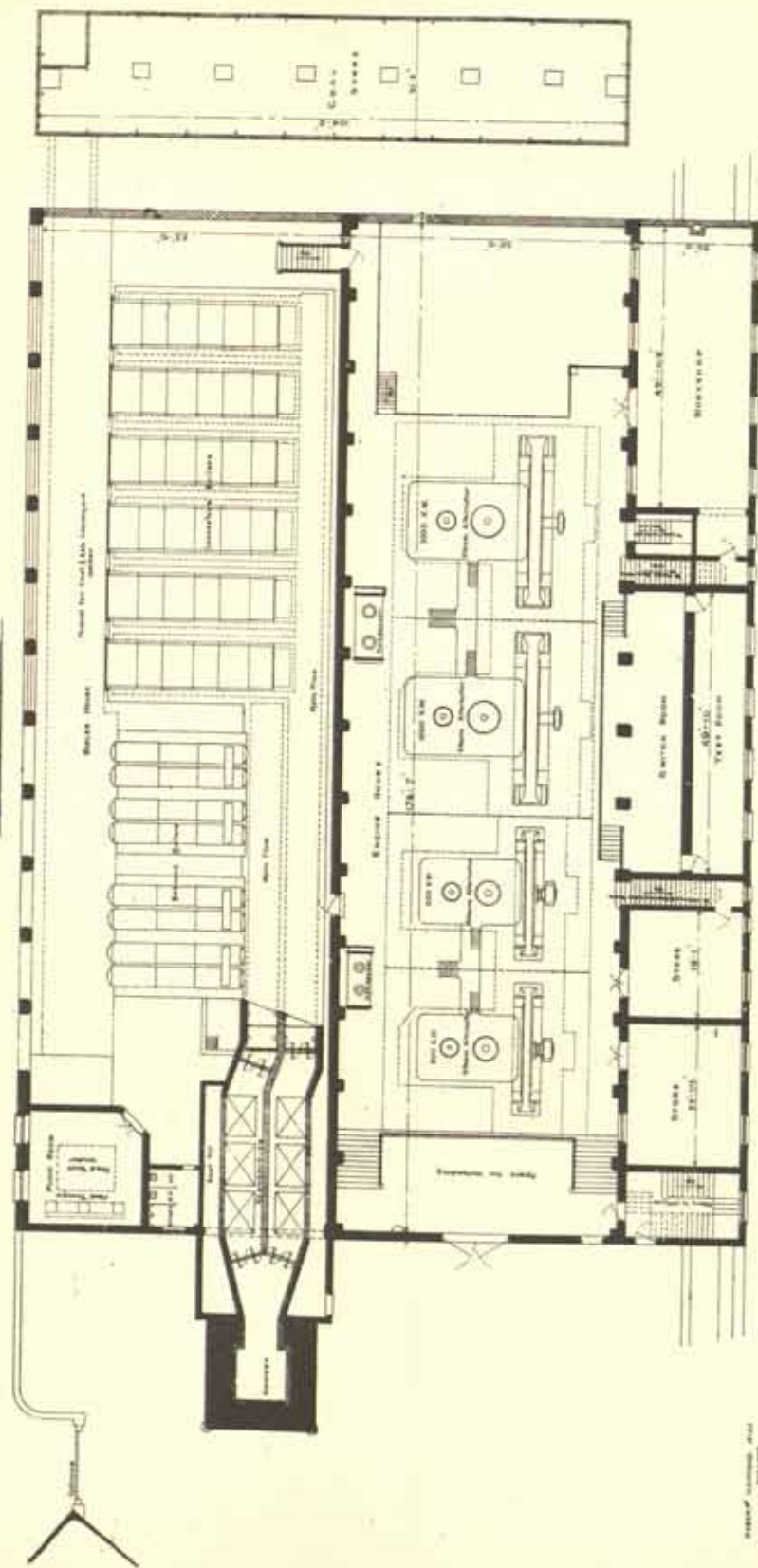
UNDERGROUND ELECTRIC RAILWAYS
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OF LONDON, LIMITED.
— CHELSEA GENERATING STATION. —





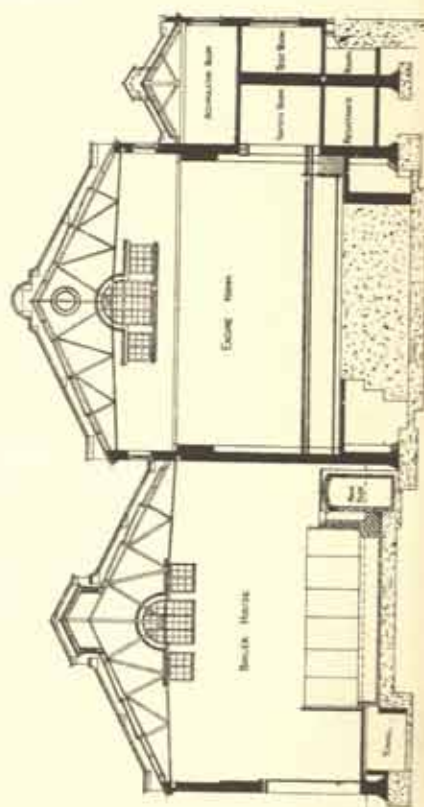
CITY OF DUBLIN ELECTRICITY WORKS

GROUND PLAN



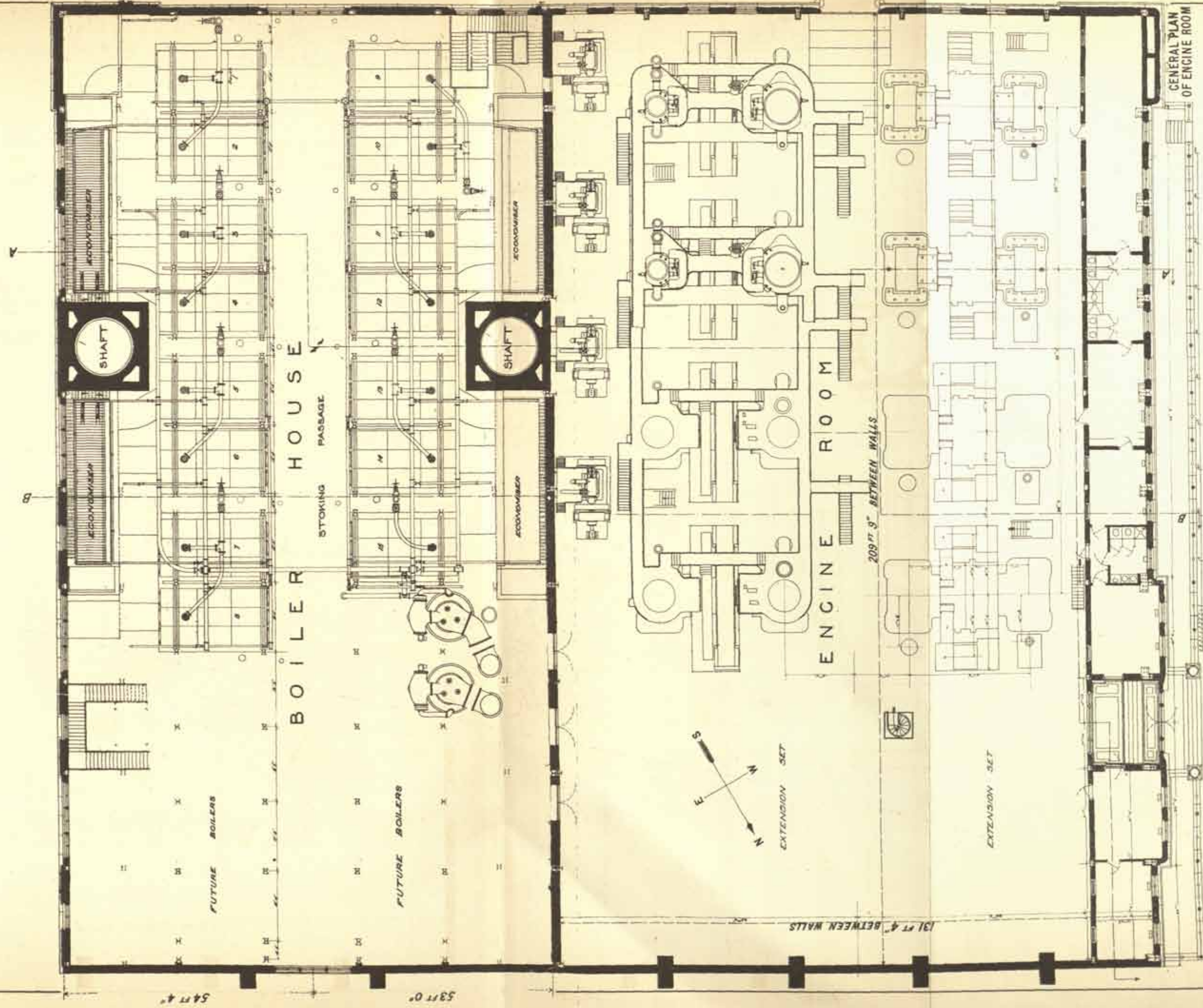
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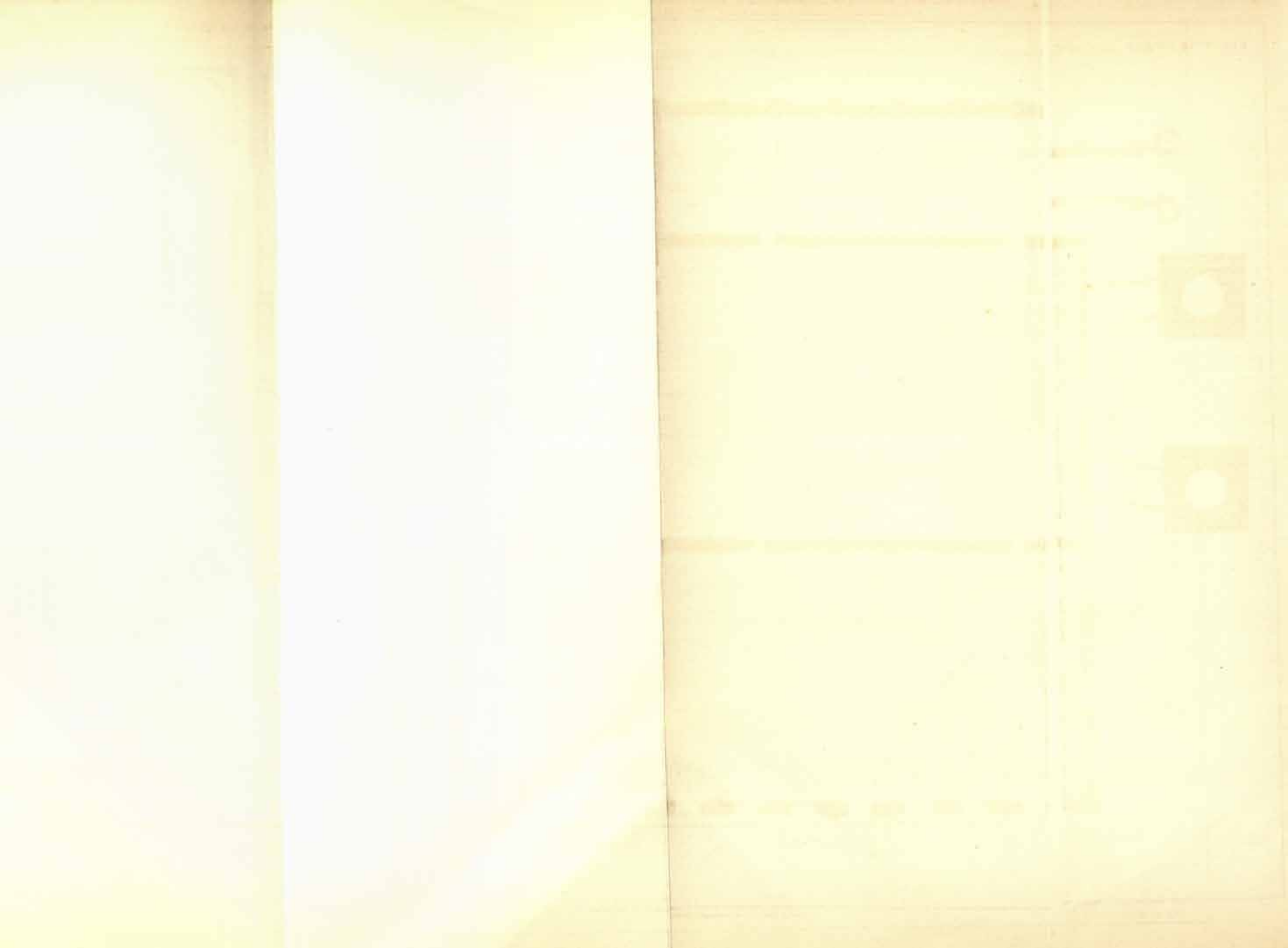
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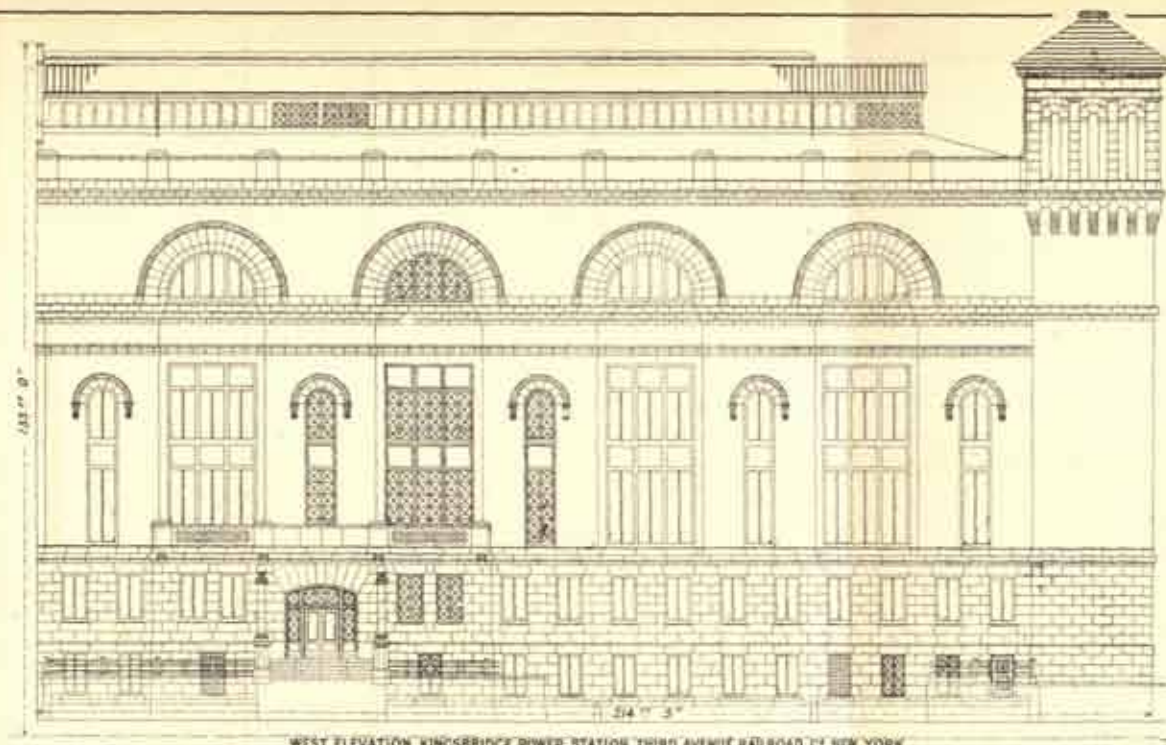


CROSS SECTION —

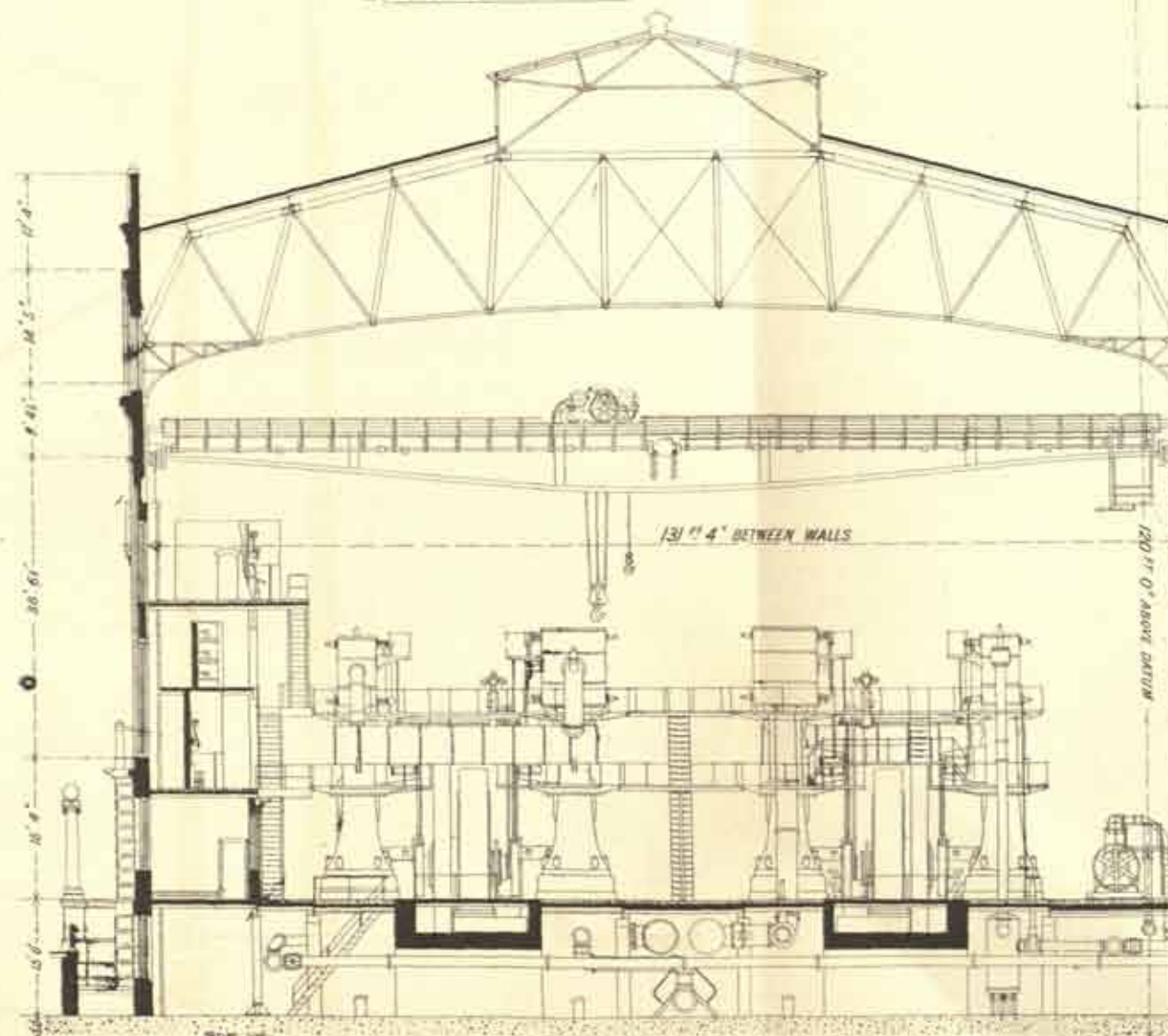
THIRD AVENUE RAILROAD, NEW YORK.
KINGSBRIDGE POWER STATION.



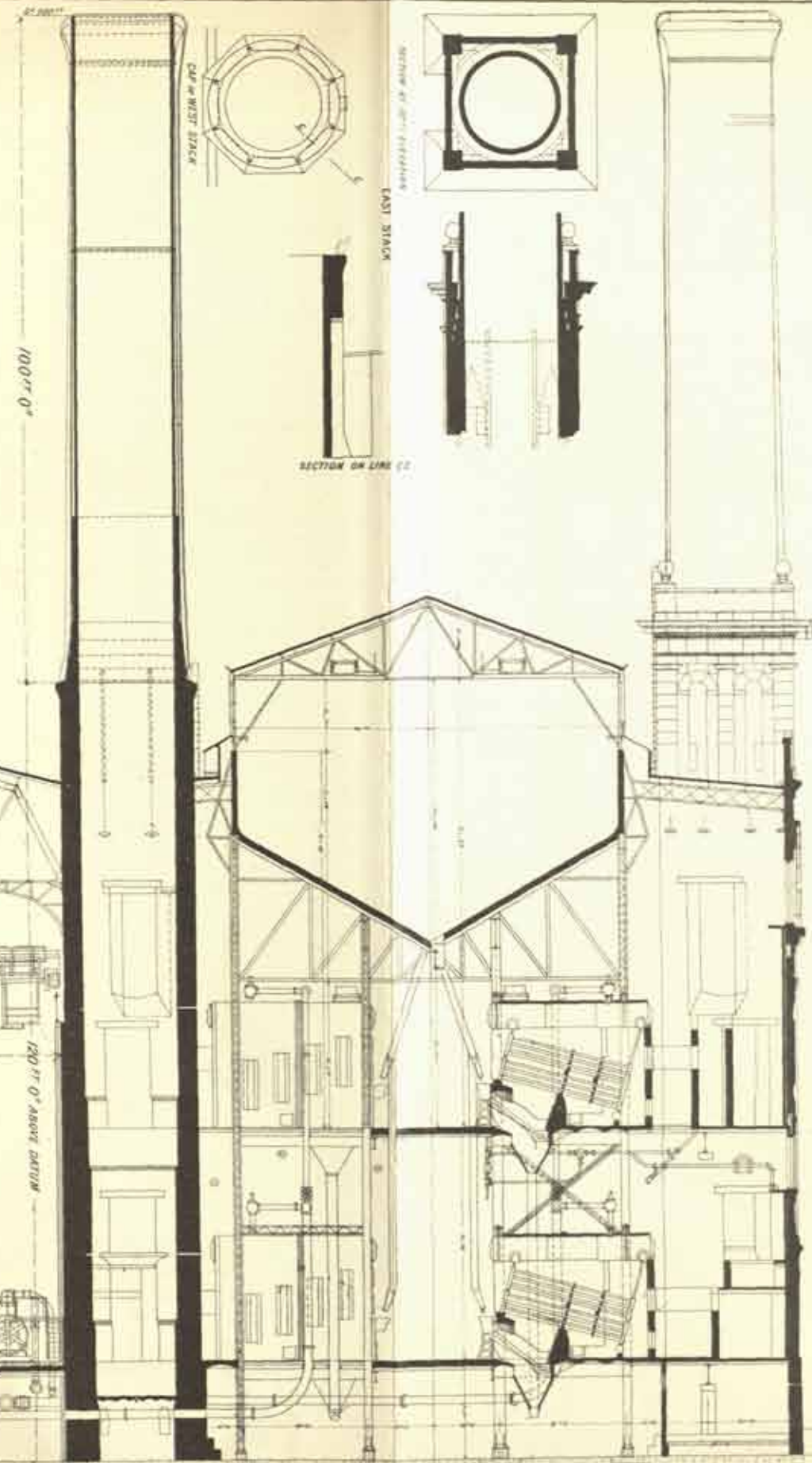




WEST ELEVATION, KINGSBRIDGE POWER STATION, THIRD AVENUE RAILROAD CO. NEW YORK.

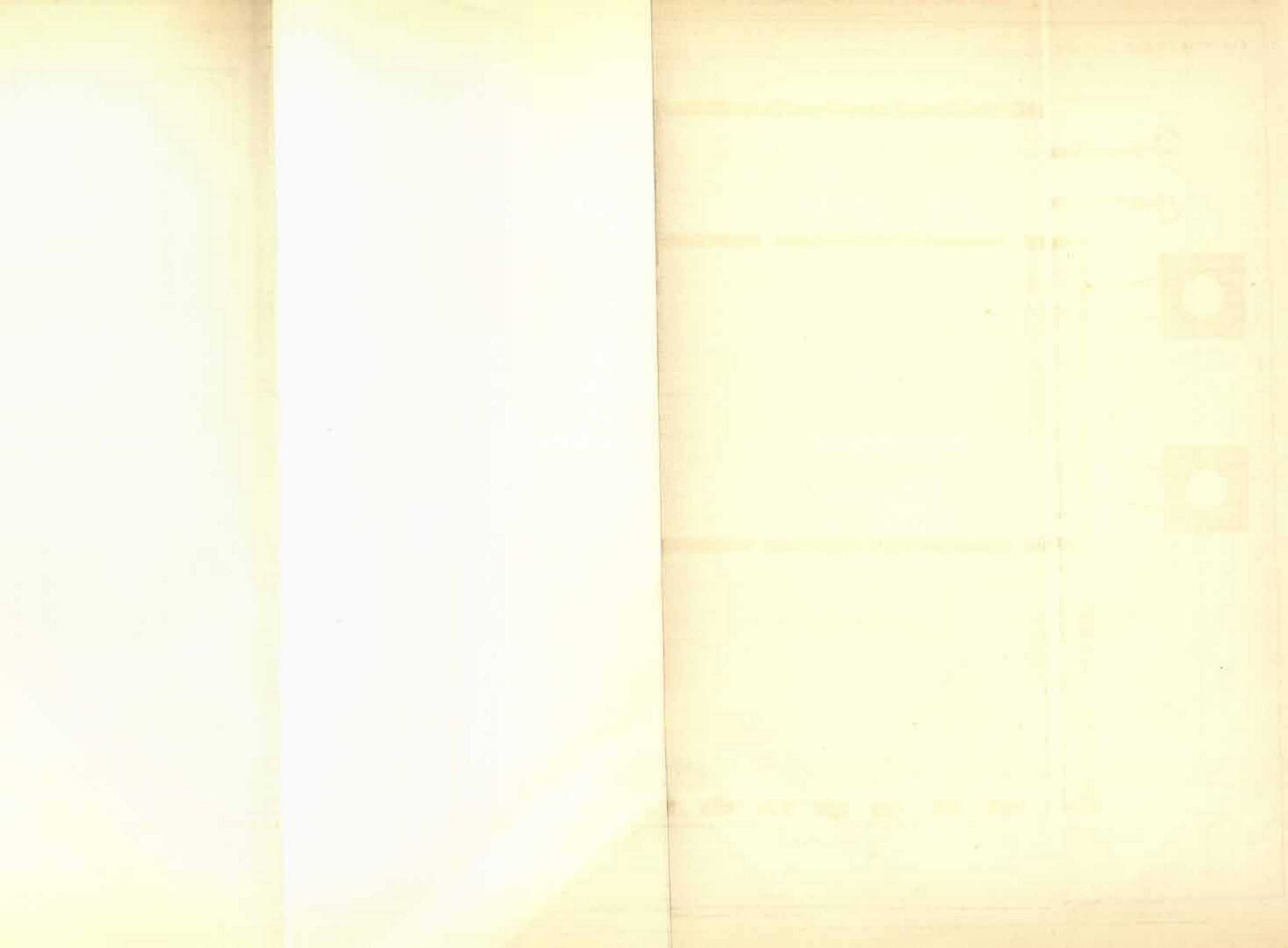


ENGINE ROOM, SECTION ON LINE B. B.
KINGSBRIDGE POWER STATION, THIRD AVENUE RAILROAD CO.
NEW YORK



BOILER HOUSE, SECTION ON LINE A. A. KINGSBRIDGE POWER STATION, THIRD AVENUE RAILROAD CO. NEW YORK.

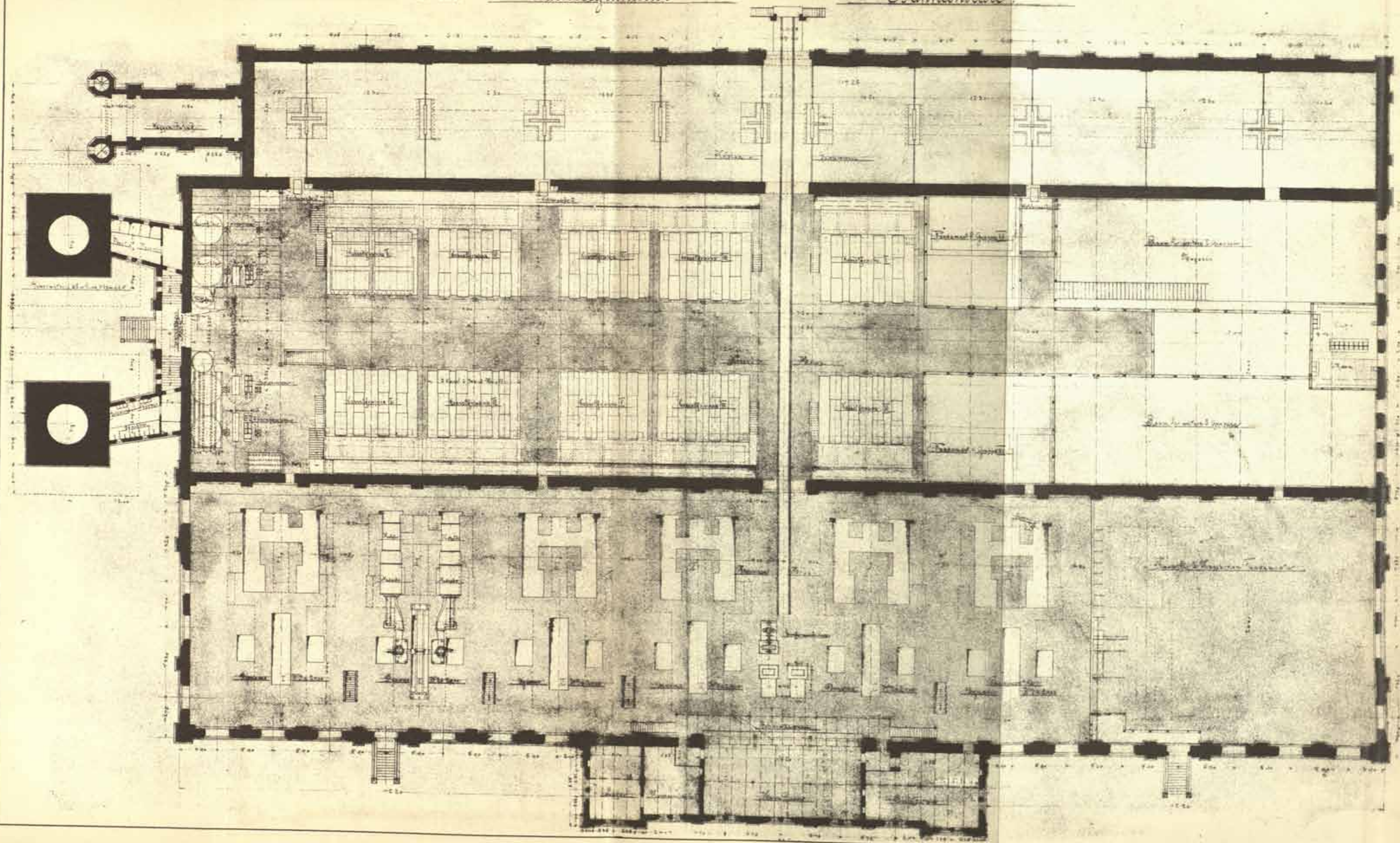
THE WESTINGHOUSE, CHURCH, KERR & CO.
NEW YORK. Engineers.

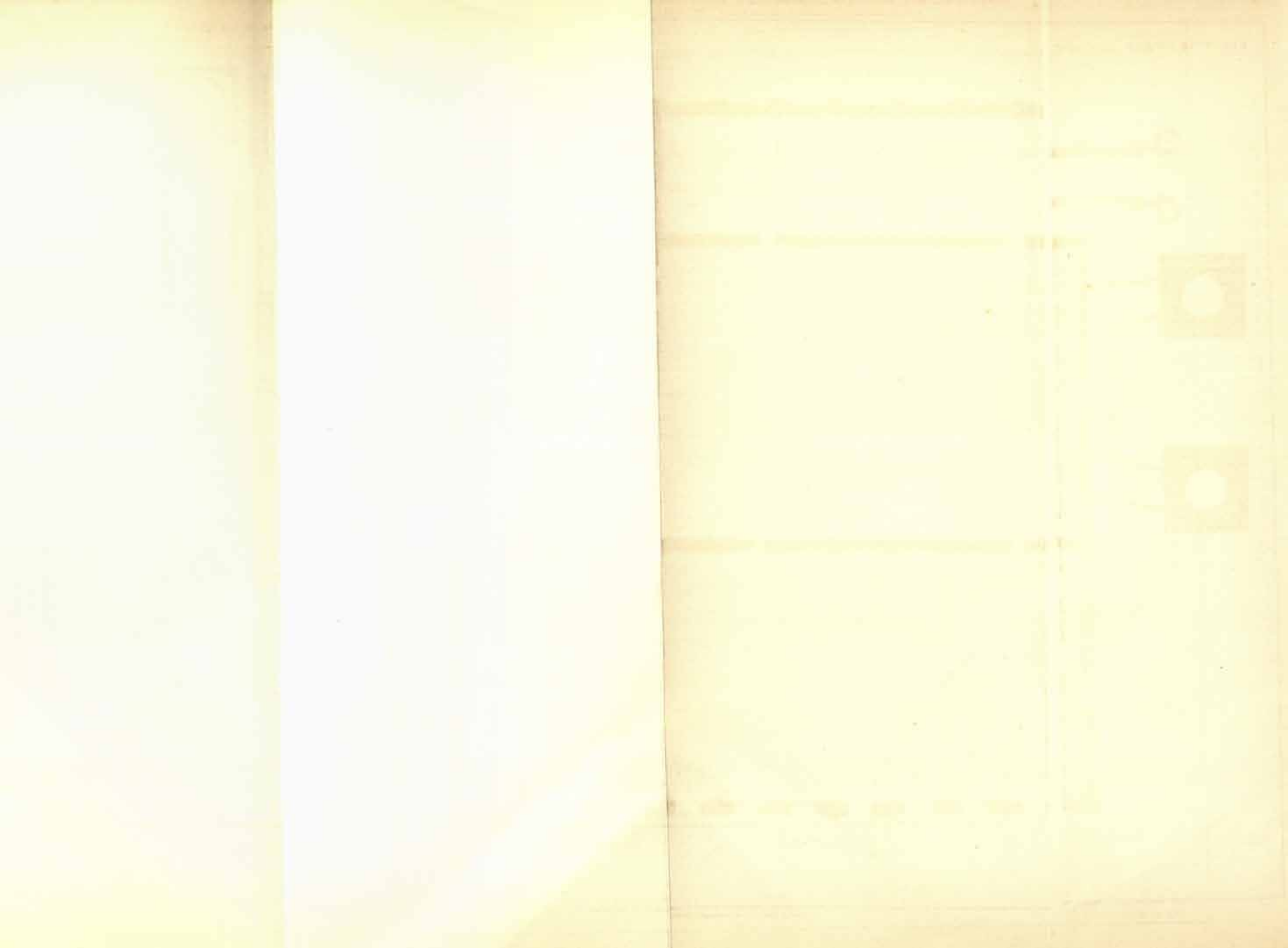


ELECTRIC POWER STATION OF THE MUNICIPALITY OF VIENNA.

Partenegründung

Bahnconkale



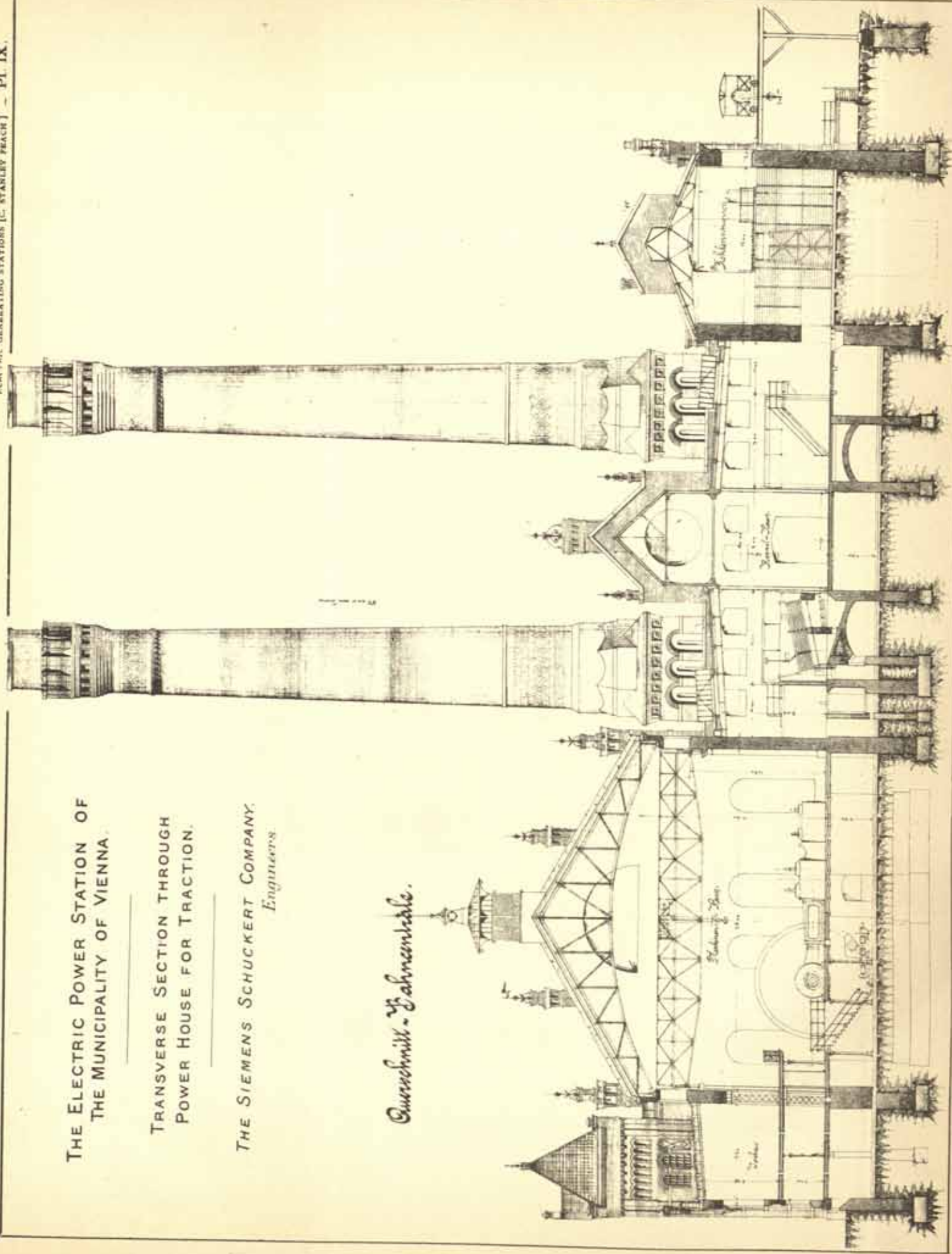


THE ELECTRIC POWER STATION OF
THE MUNICIPALITY OF VIENNA.

TRANSVERSE SECTION THROUGH
POWER HOUSE FOR TRACTION.

THE SIEMENS SCHUCKERT COMPANY,
Engineers.

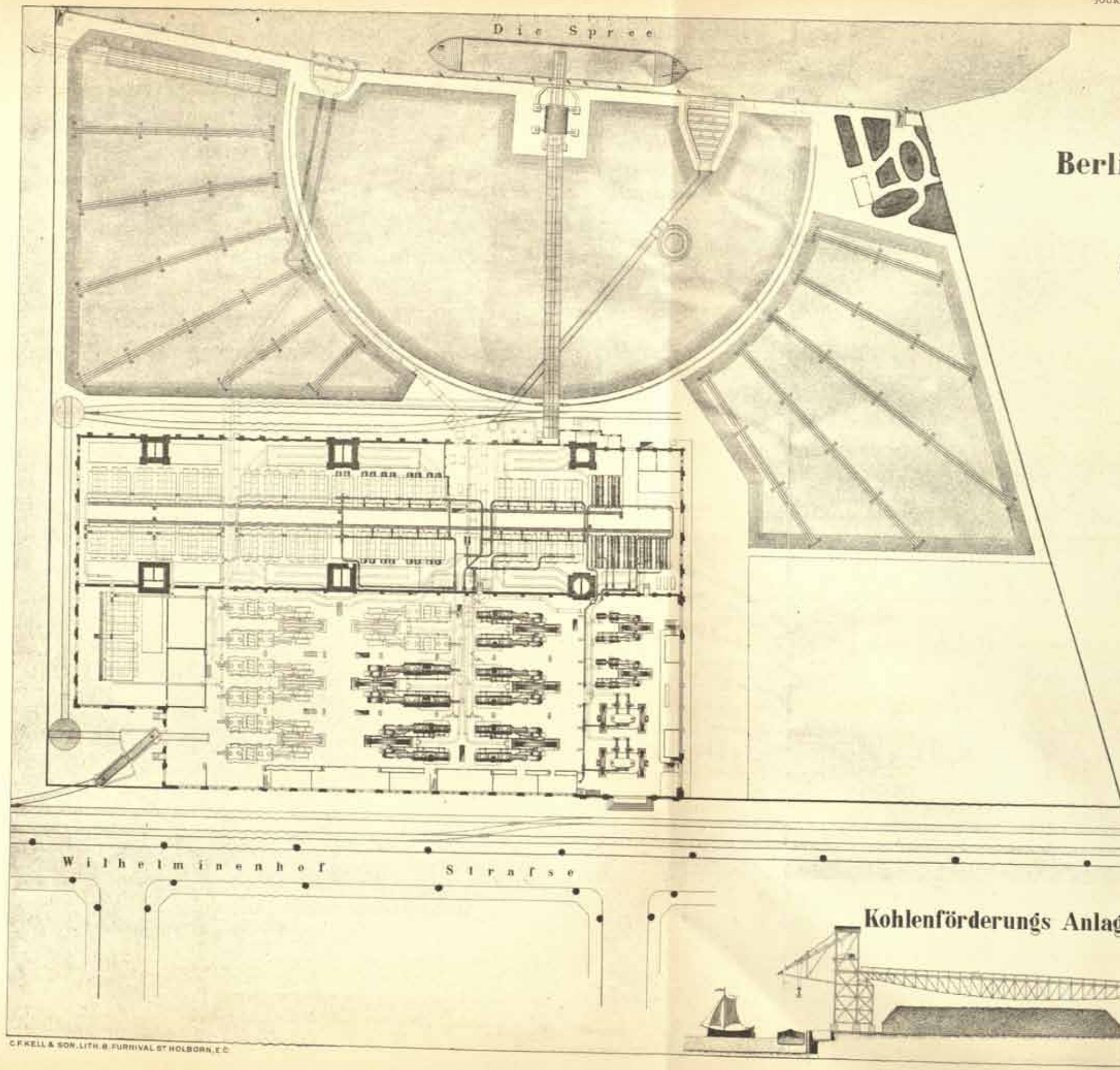
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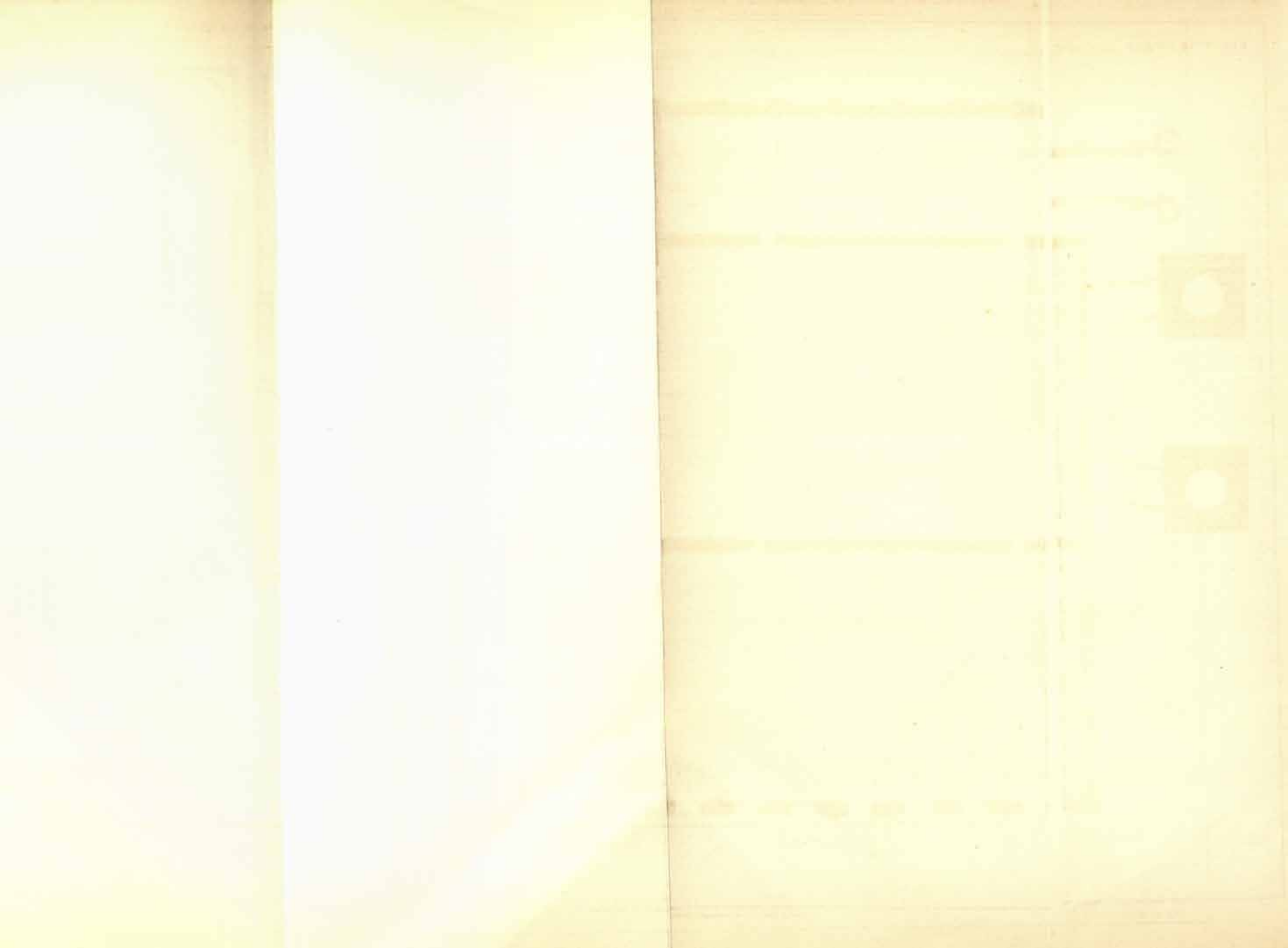


Berliner Elektrizitäts Werke

Centrale Oberspree.

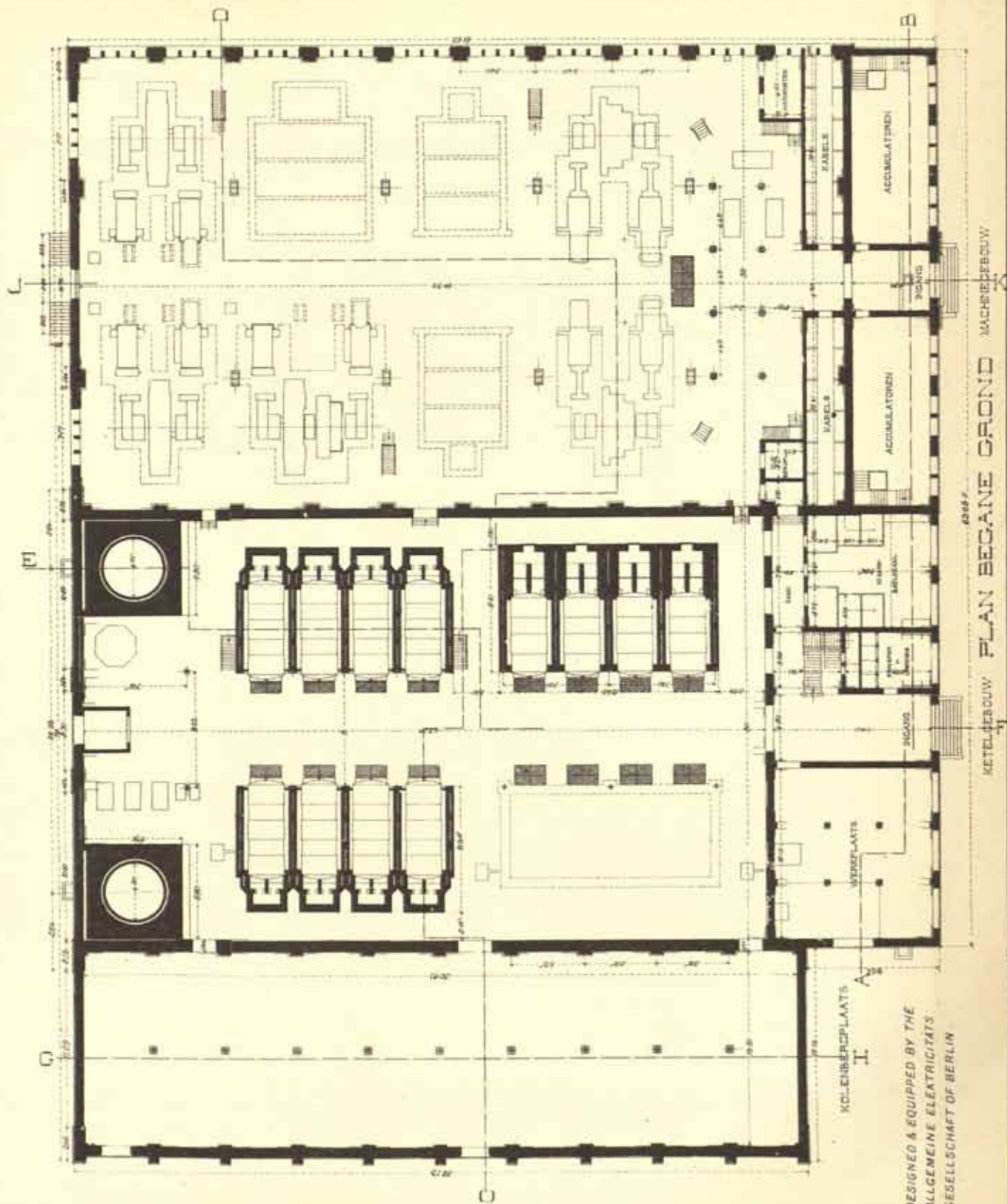
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MUNICIPAL STATION AT AMSTERDAM. GEMEENTE AMSTERDAM 1902

MUNICIPAL STATION AT AMSTERDAM.



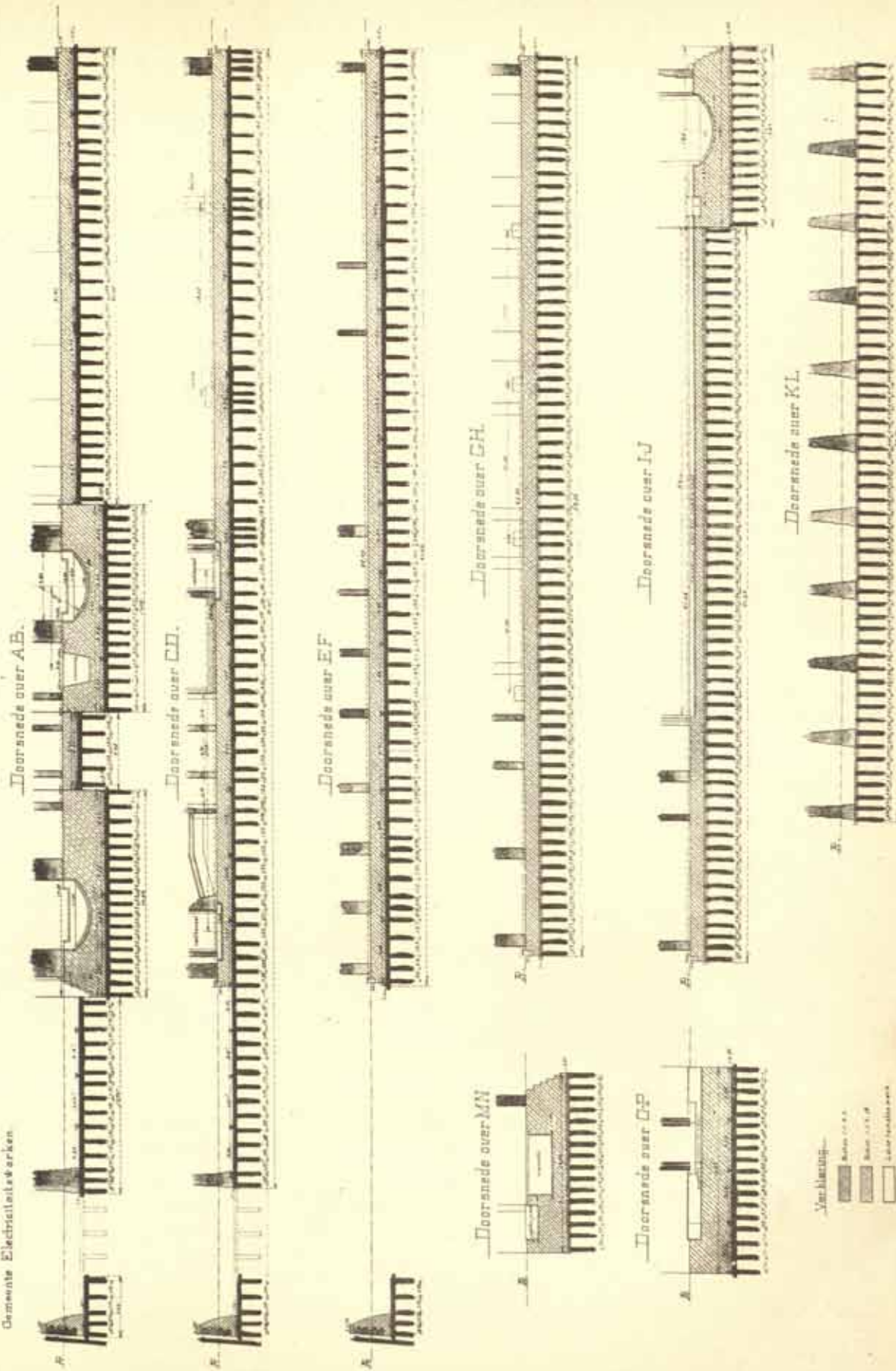
DESIGNED & EQUIPPED BY THE
ALLGEMEINE ELECTRICITÄTS-
GESELLSCHAFT OF BERLIN

Beeld N^o 75/1801
AMSTERDAM.

Gemonte Elektricitatswerken

Doorsneden Paal-en Betonfundering.

Bestandsaankening
Blad X



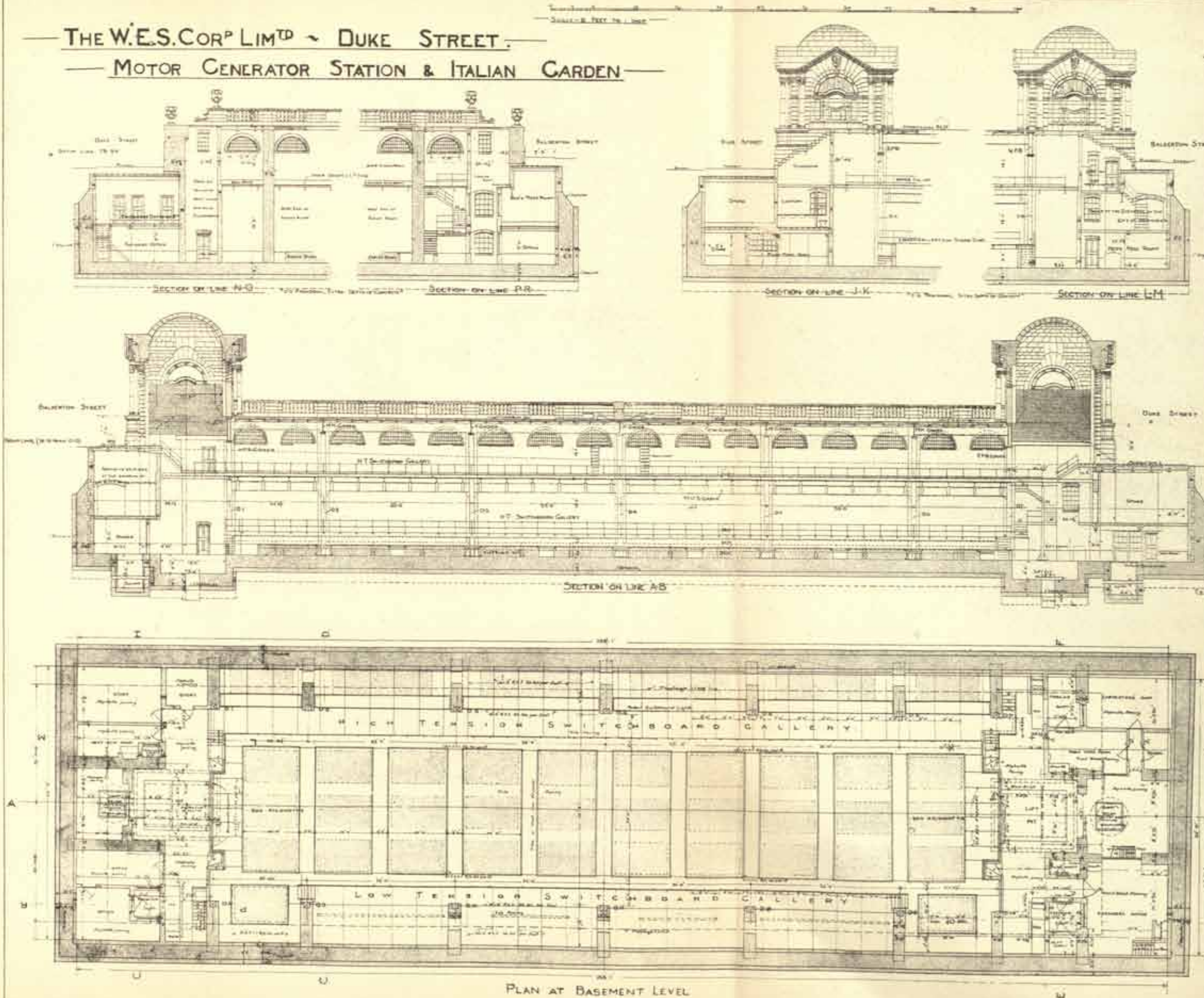
THE ALLGEMEINE ELEKTRICITÄTS GESELLSCHAFT
Engineers

Schaal 1:100.

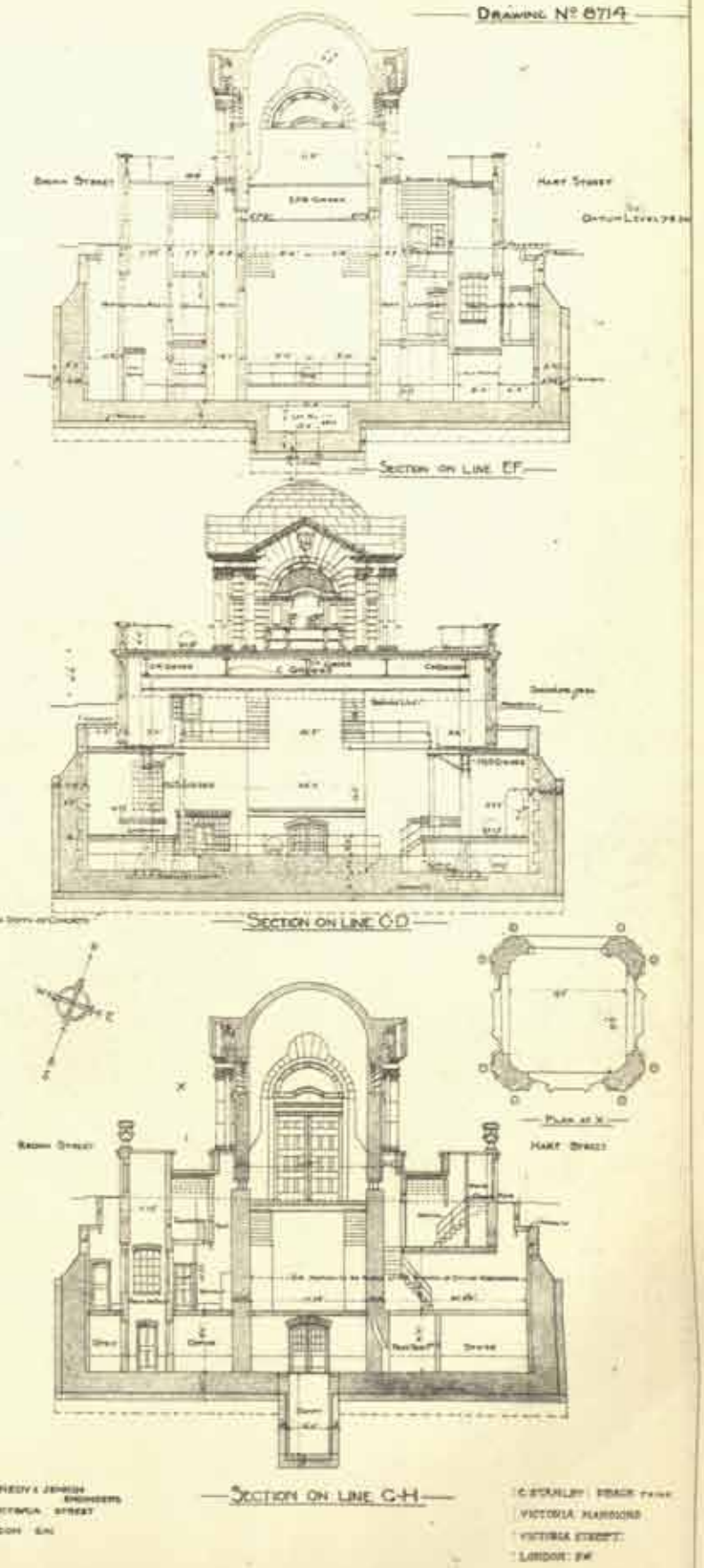
Beeld N^o 75/1801
Amsterdam
Geprint bij de Koninklijke Akademie van Wetenschappen

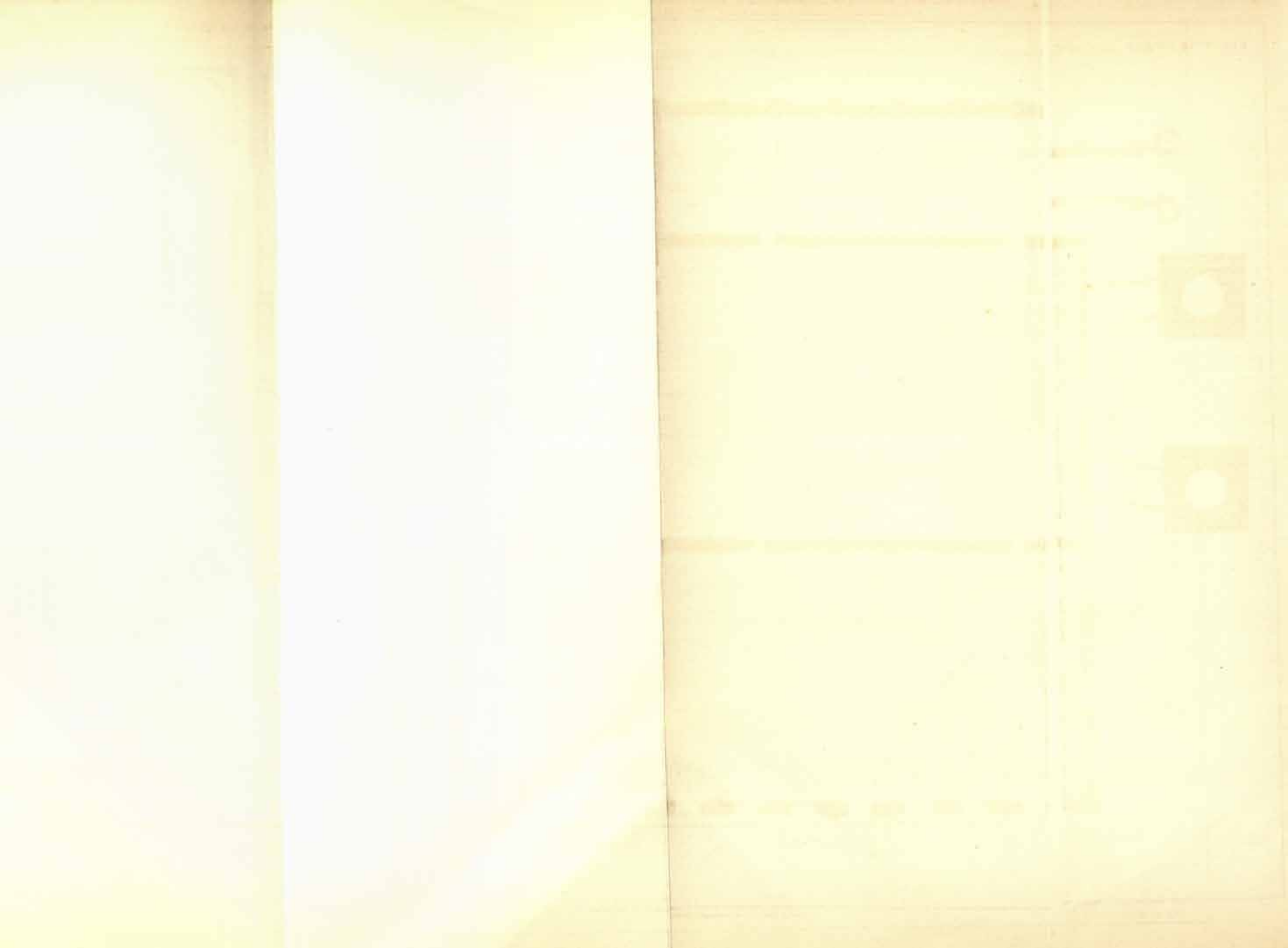
C.F. KELL & SON, LITH. B. FURNIVAL ST. HOLBORN, E.C.

THE W.E.S. CORP^{LTD} ~ DUKE STREET.
— MOTOR GENERATOR STATION & ITALIAN GARDEN —

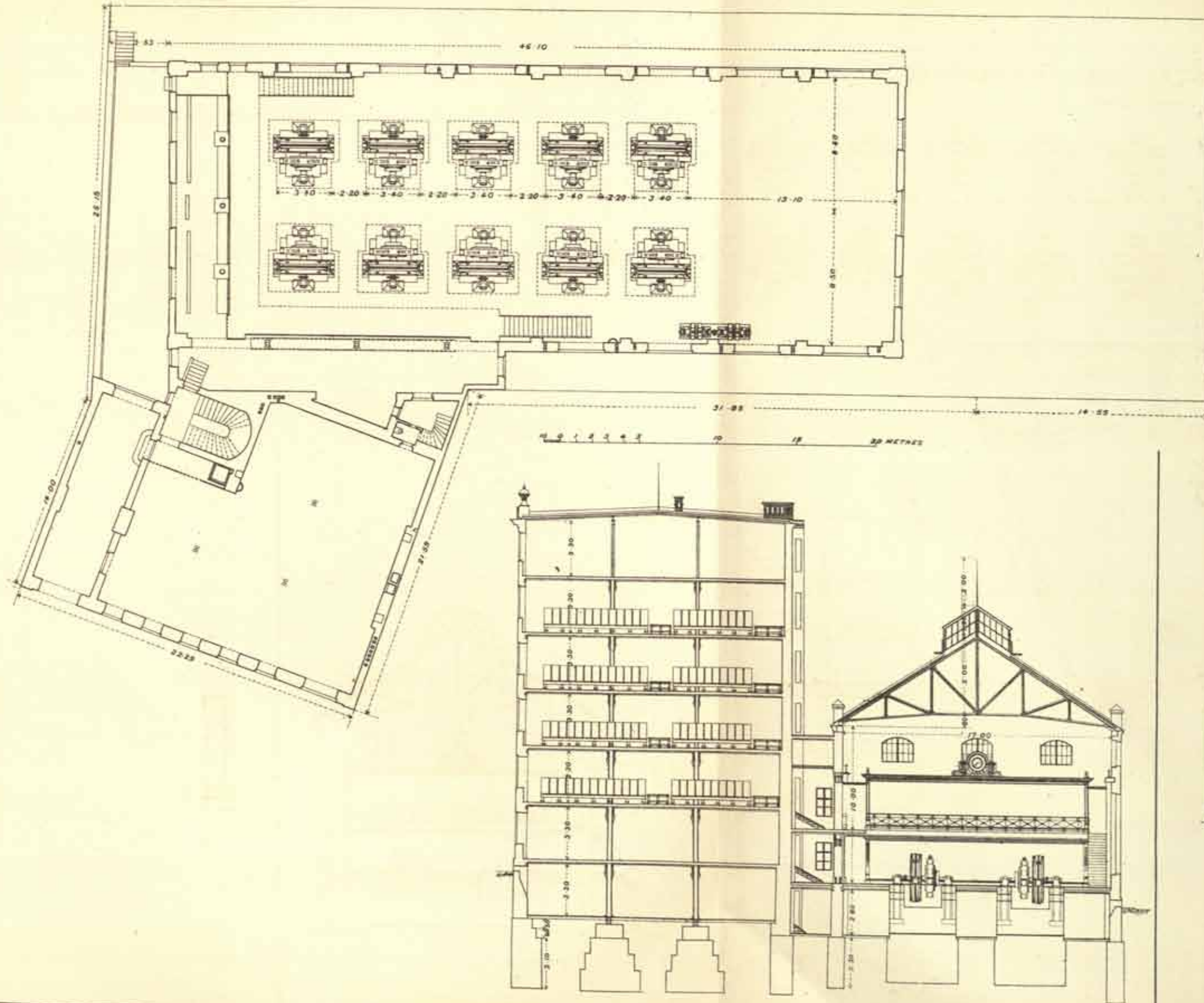


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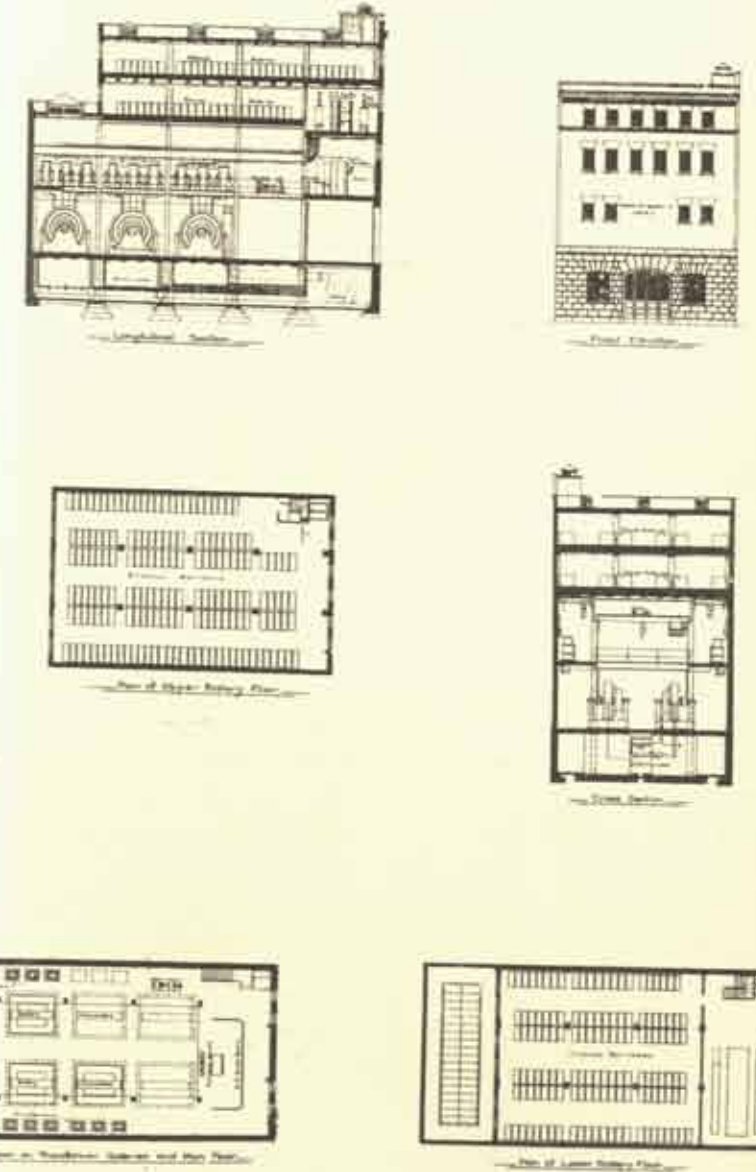


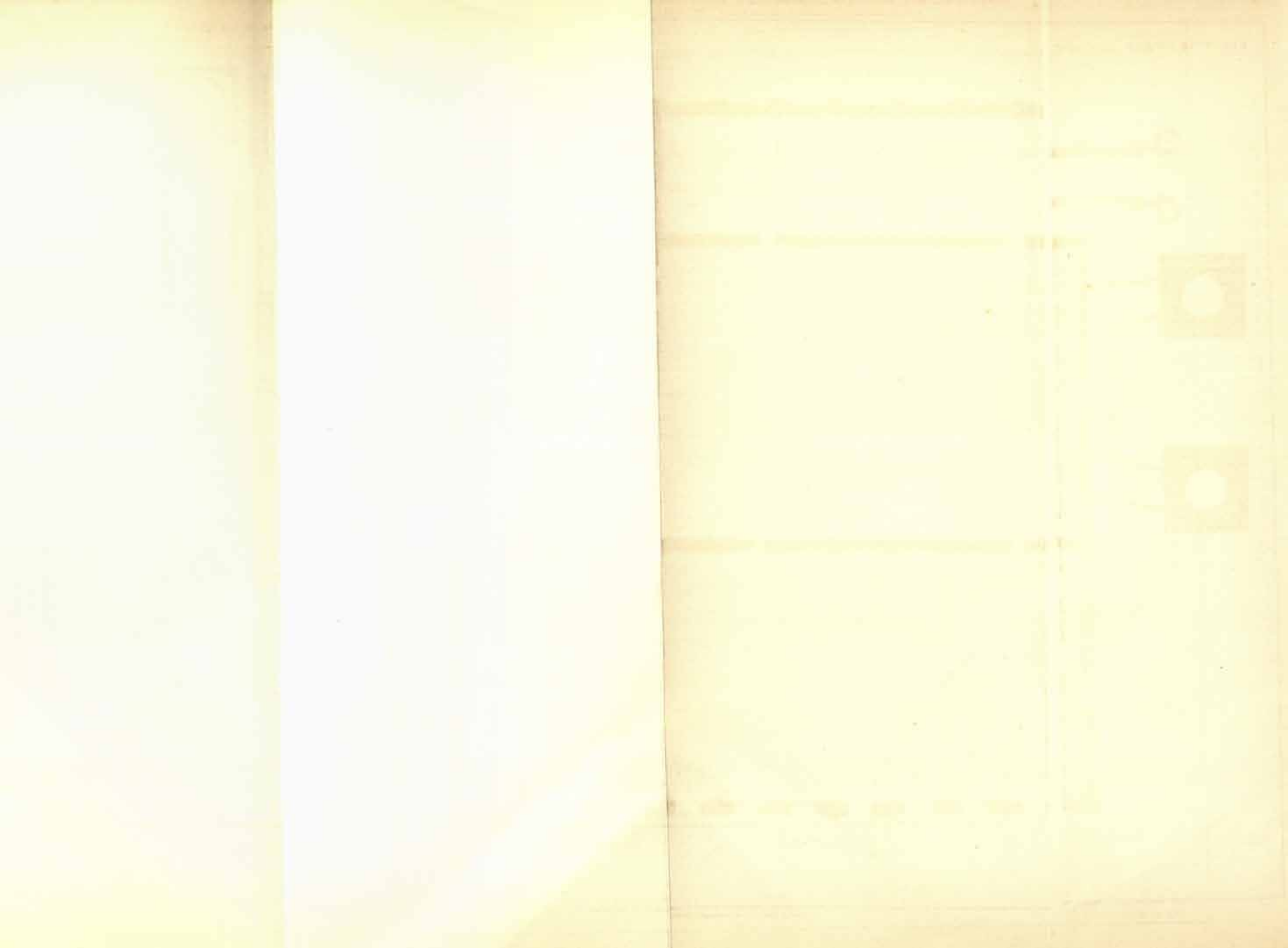


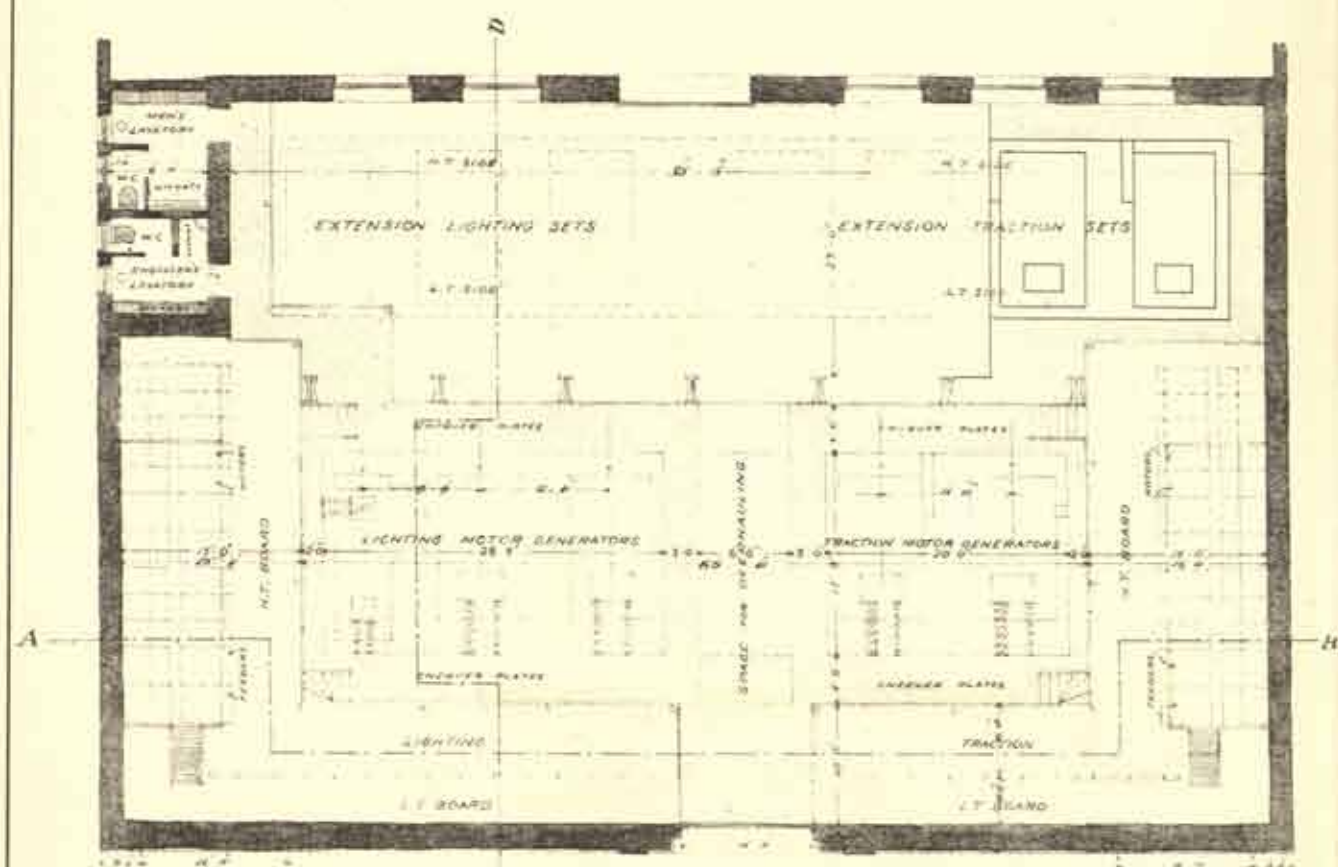
SUB-STATION OF THE MUNICIPALITY OF VIENNA.



MANHATTAN RAILWAY COMPANY, NEW YORK. SUB-STATION No 6.

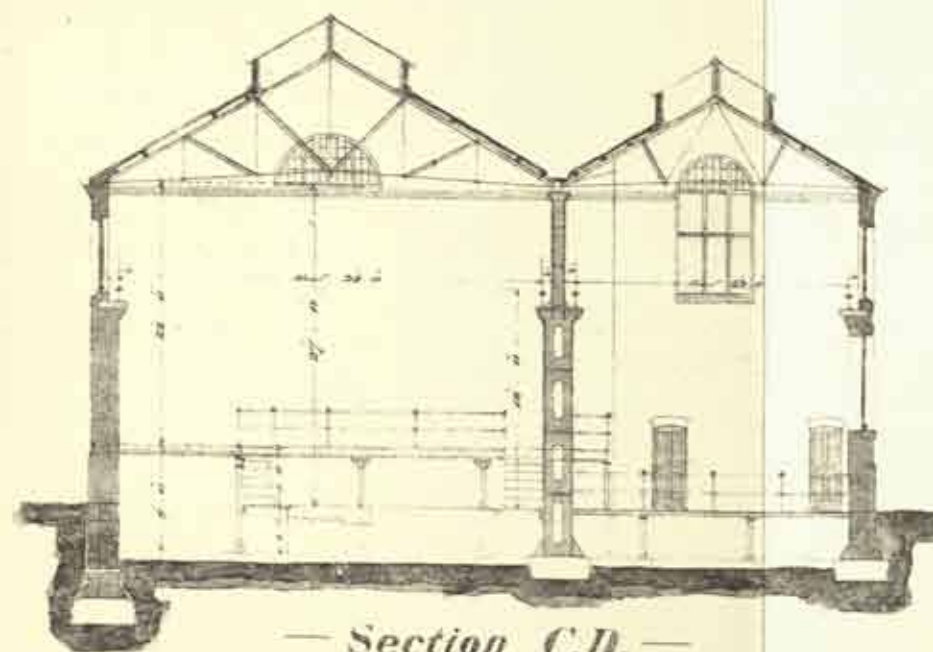






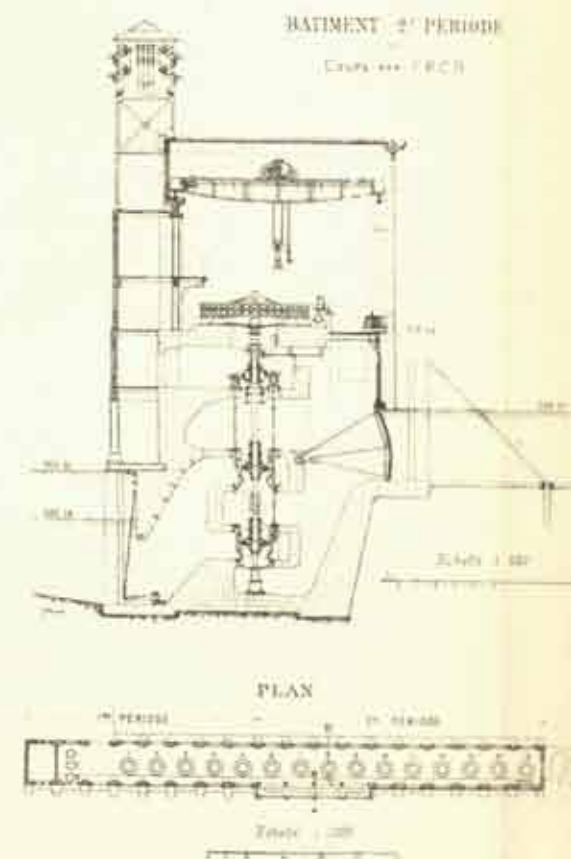
Ground Plan.—

BENNETT STREET SUB-STATION OF THE MANCHESTER CORPORATION

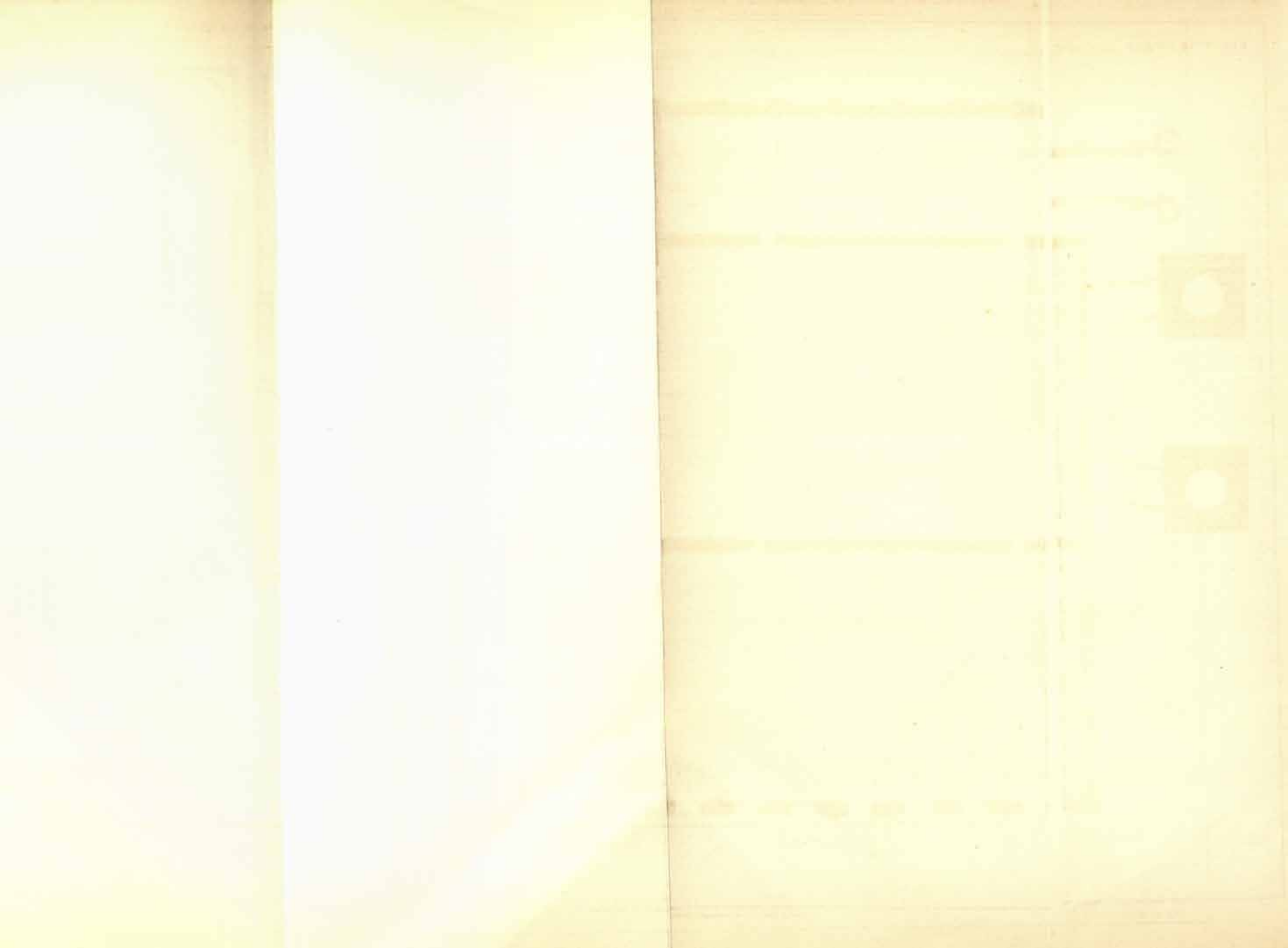


Section C.D.—

KENNEDY & JENKIN,
Engineers.
17 VICTORIA STREET,
S.W.

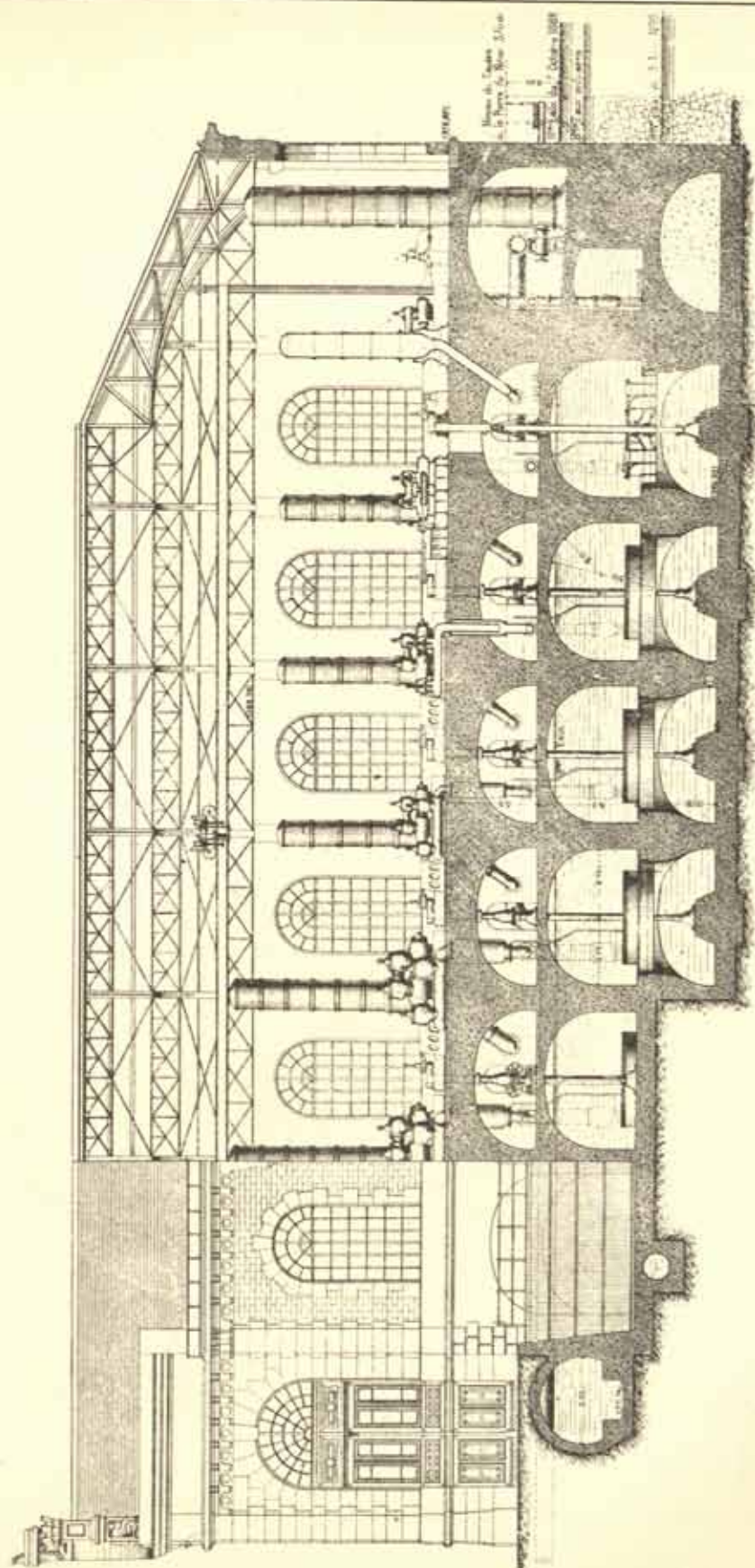


SECOND WATER POWER STATION OF
GENEVA, AT CHEVRES
COL. TURRETTINI



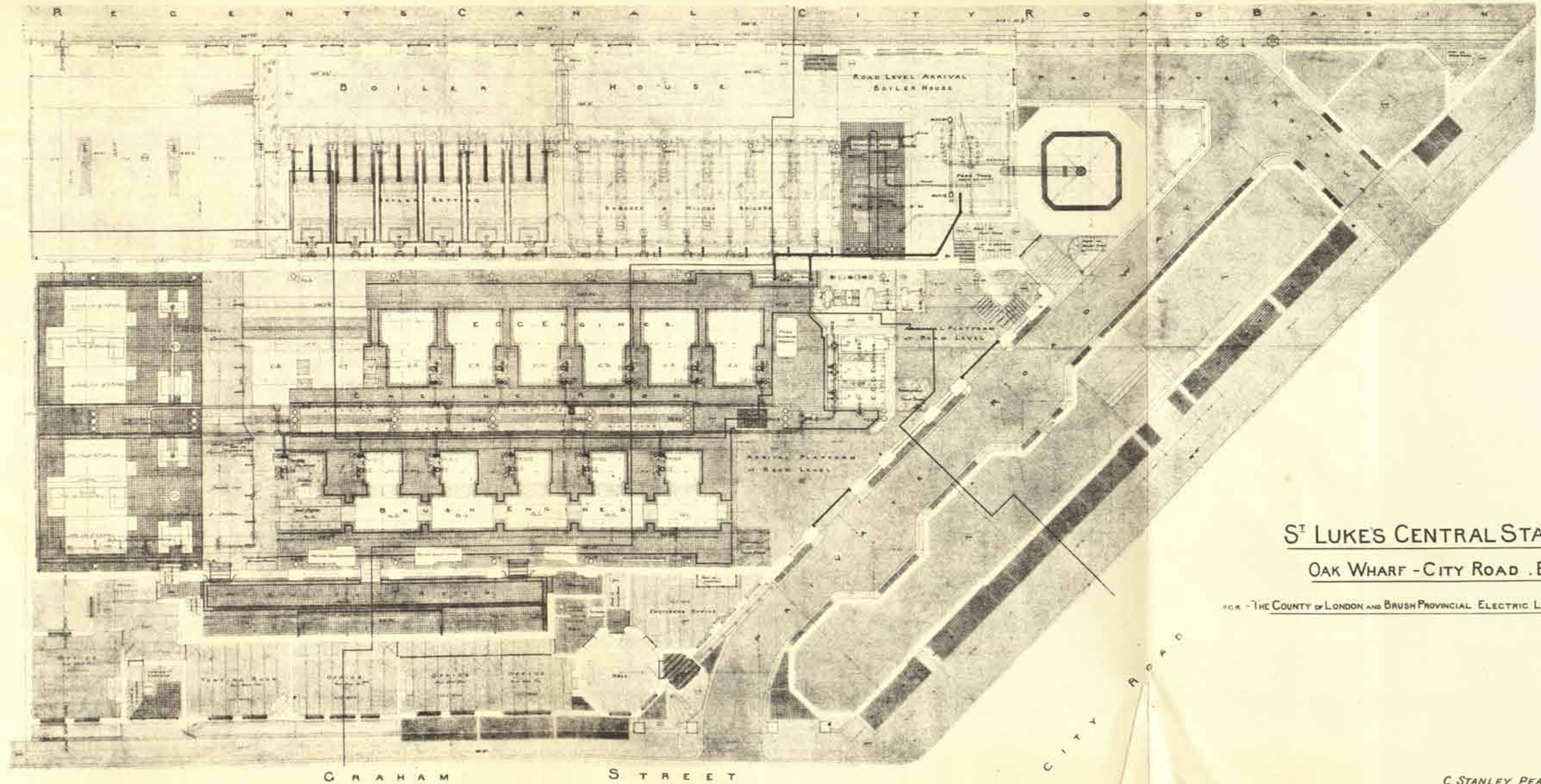
FIRST POWER STATION OF GENEVA.
COL. TURRETTINI, ENGINEER

Elevation et Coupe longitudinale



Echelle





ST LUKE'S CENTRAL STATION.

OAK WHARF - CITY ROAD . E.C.

FOR THE COUNTY OF LONDON AND BRUSH PROVINCIAL ELECTRIC LIGHTING COMPANY LTD.

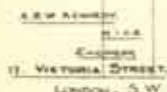
A. J. LAWSON,
Engineer

Plan taken principally at Ground Floor Level.

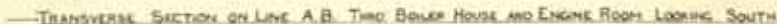
C. STANLEY PEACH, F.R.I.B.A.
Architect,
28 VICTORIA STREET, S.W.

ELECTRIC LIGHT STATION

PLAN AT GROUND FLOOR LEVEL.

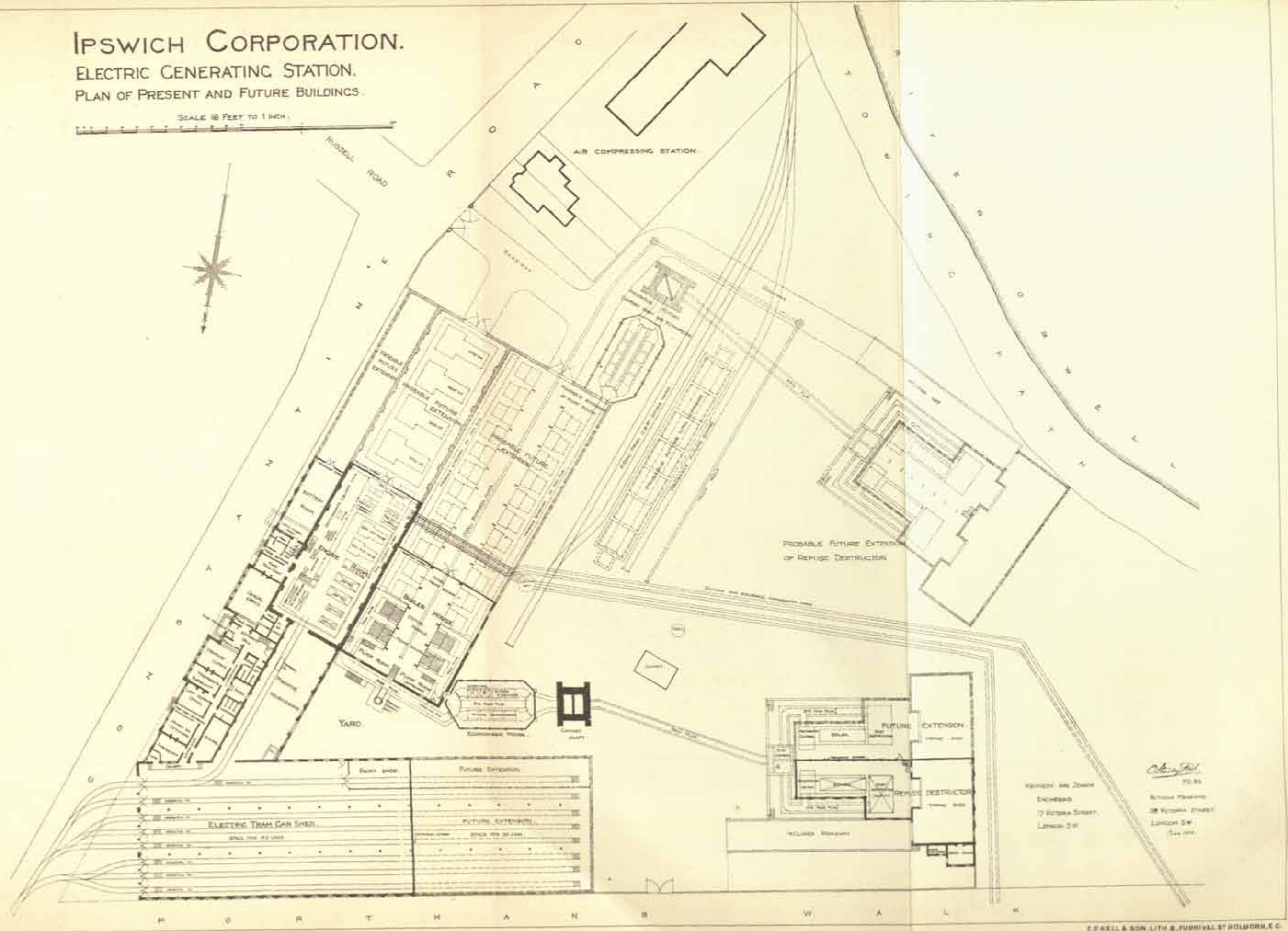


ELEVATION AND TRANSVERSE SECTION



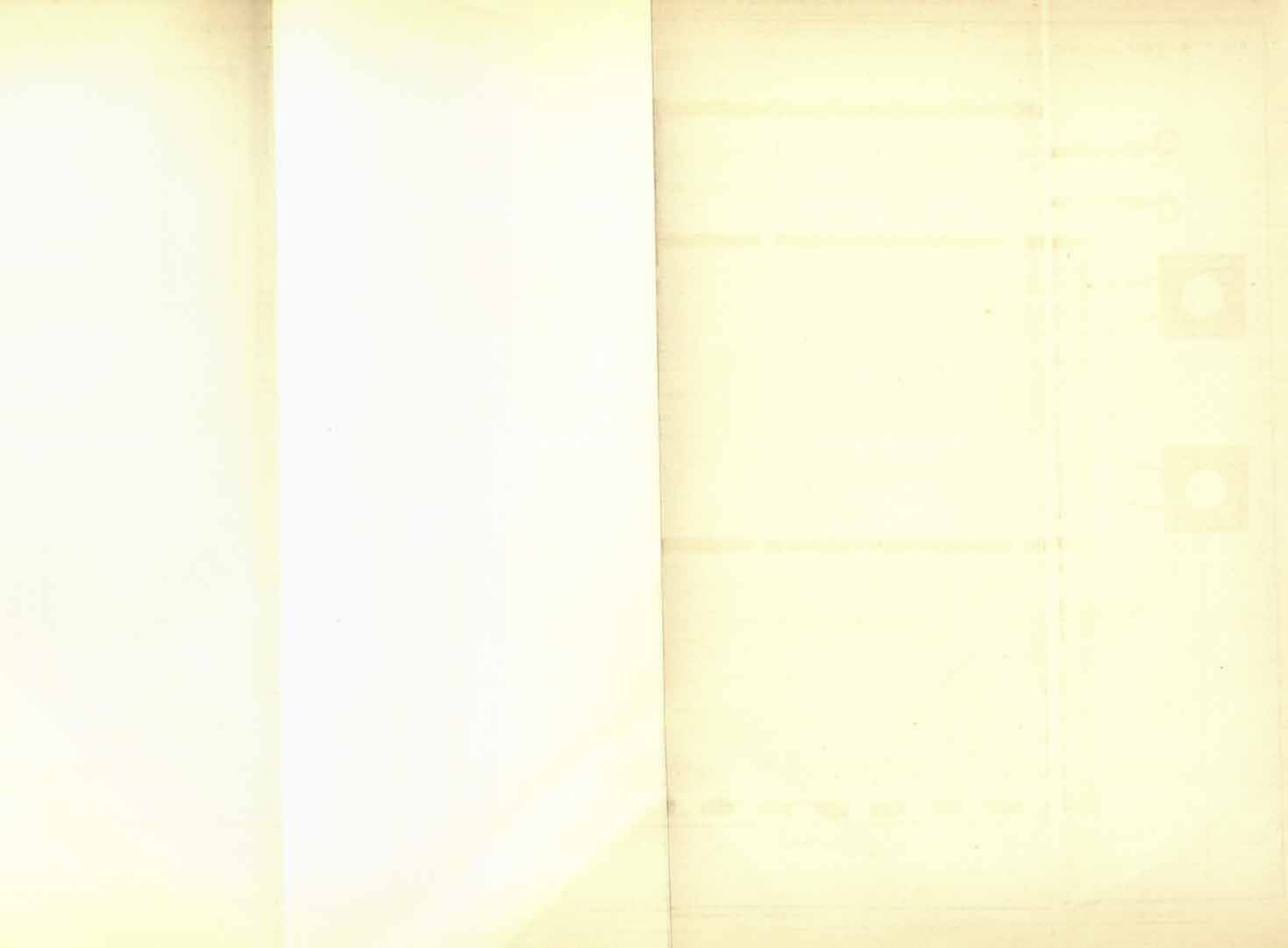
Ipswich Corporation. ELECTRIC GENERATING STATION. PLAN OF PRESENT AND FUTURE BUILDINGS.

SCALE 16 FEET TO 1 INCH.



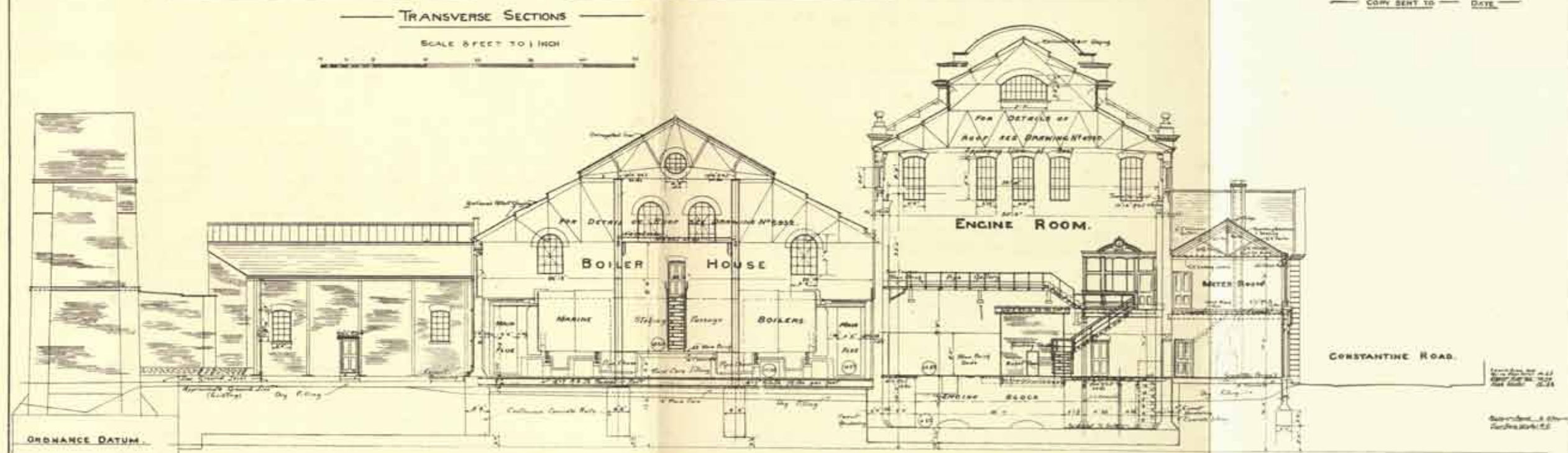
REMOVED AND JONAS
ENGINEERS
17 VICTORIA STREET
LONDON S.W.

Chas. P. Hill
P.O. 85
25 Victoria Street
LONDON S.W.
See plan.

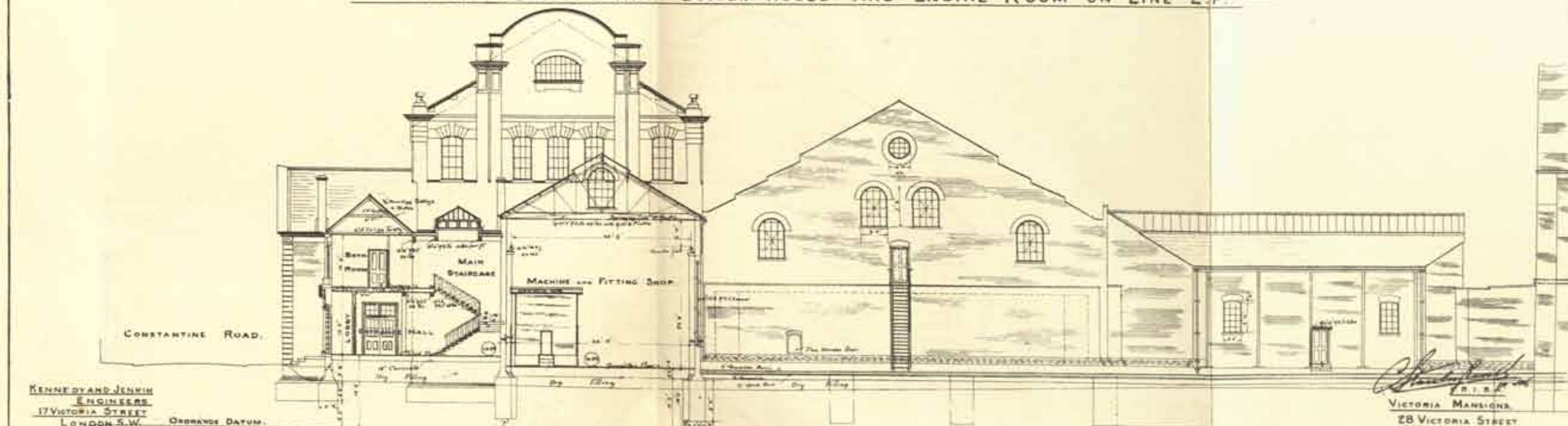


— IPSWICH CORPORATION — ELECTRIC GENERATING STATION —

— DRAWING N°6921 —
— COPY SENT TO — DATE —



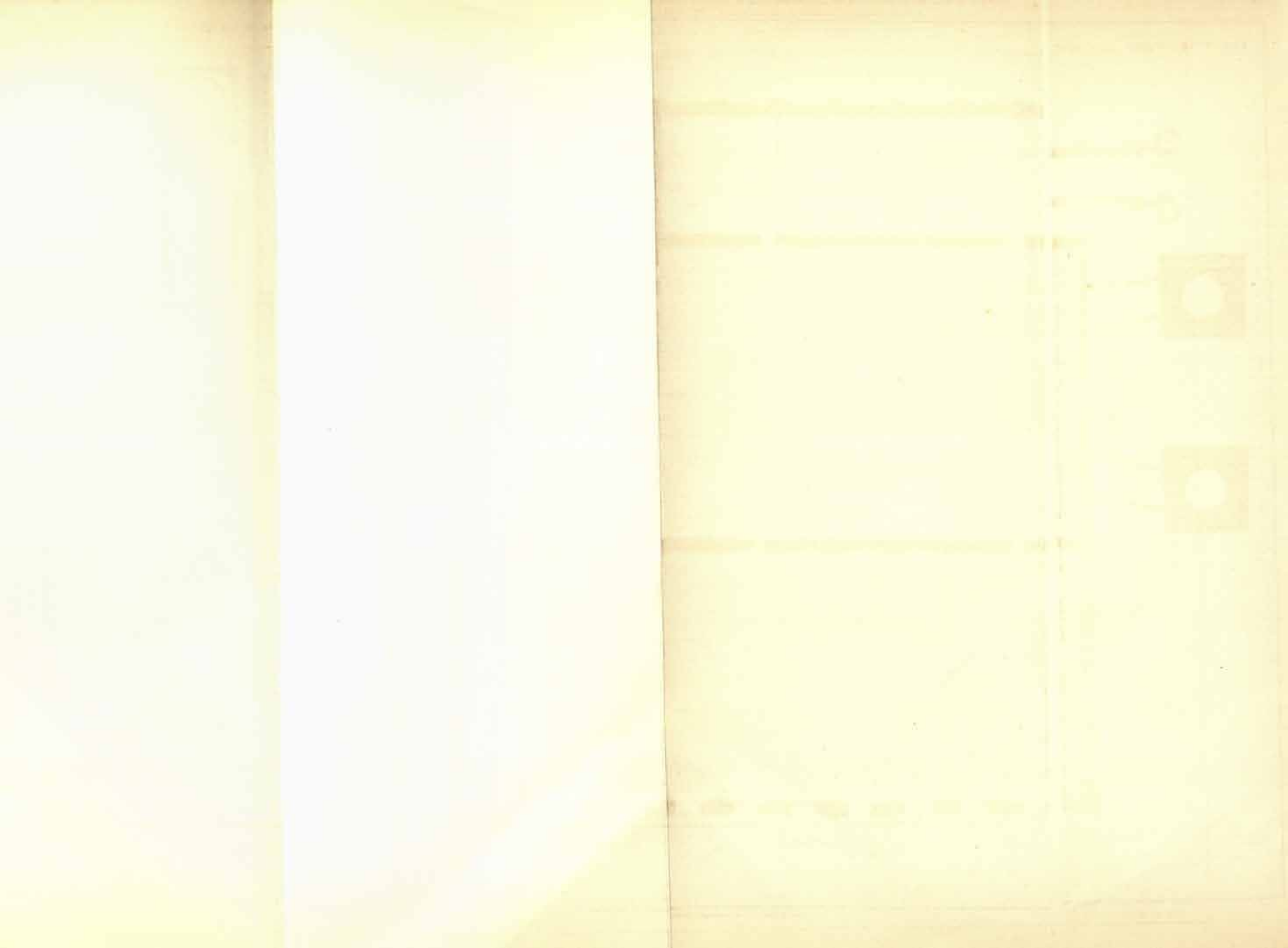
— TRANSVERSE SECTION THRO' BOILER HOUSE AND ENGINE ROOM ON LINE E-F. —

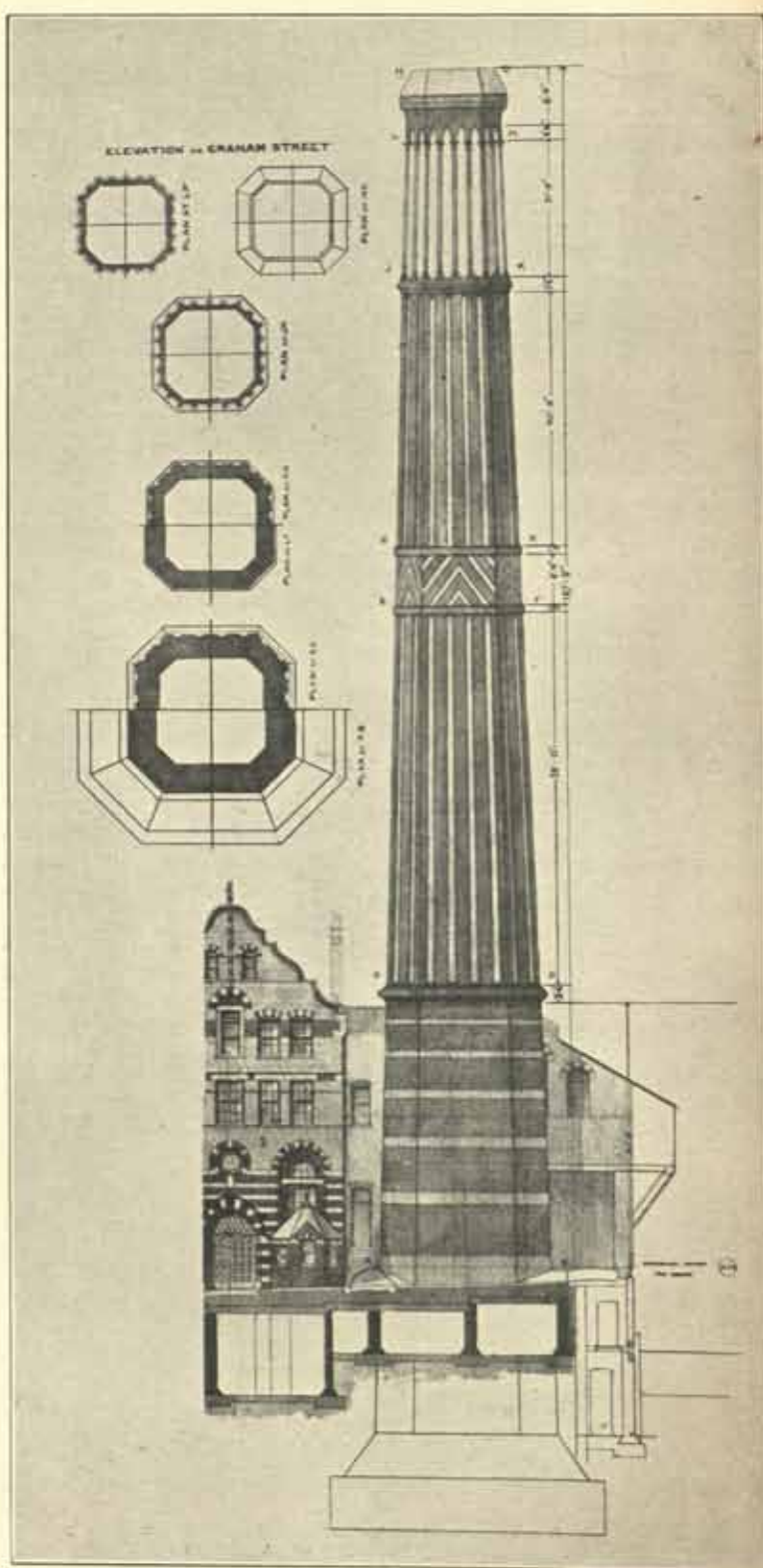
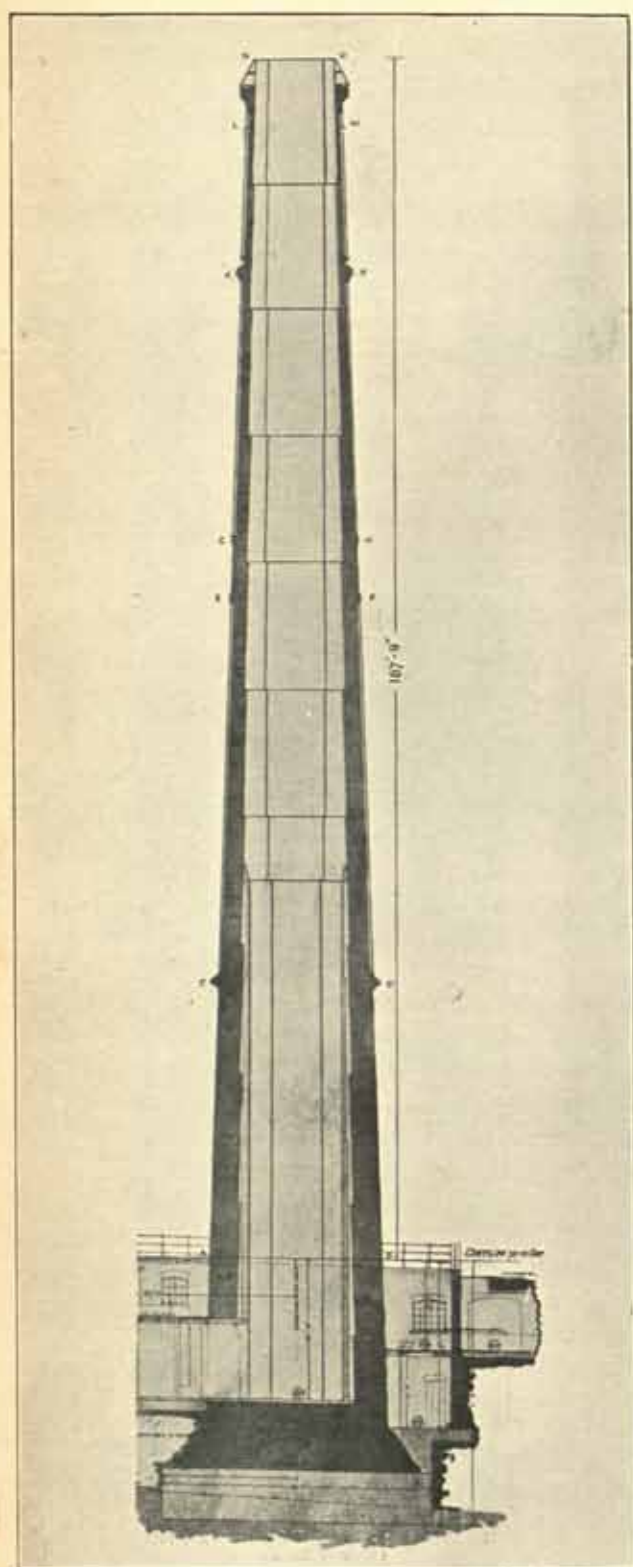


— TRANSVERSE SECTION THRO' OFFICES & WORKSHOP & NORTH ELEVATION OF BOILER HOUSE ON LINE C-H. —

KENNEDY AND JENKIN
ENGINEERS
17 VICTORIA STREET
LONDON S.W.

Stanley Peach
VICTORIA MANSIONS
28 VICTORIA STREET
LONDON S.W.





FIGS. 16 AND 17.—ST. LUKE'S CENTRAL STATION, OAK WHARF, CITY ROAD, CHIMNEY SHAFT.

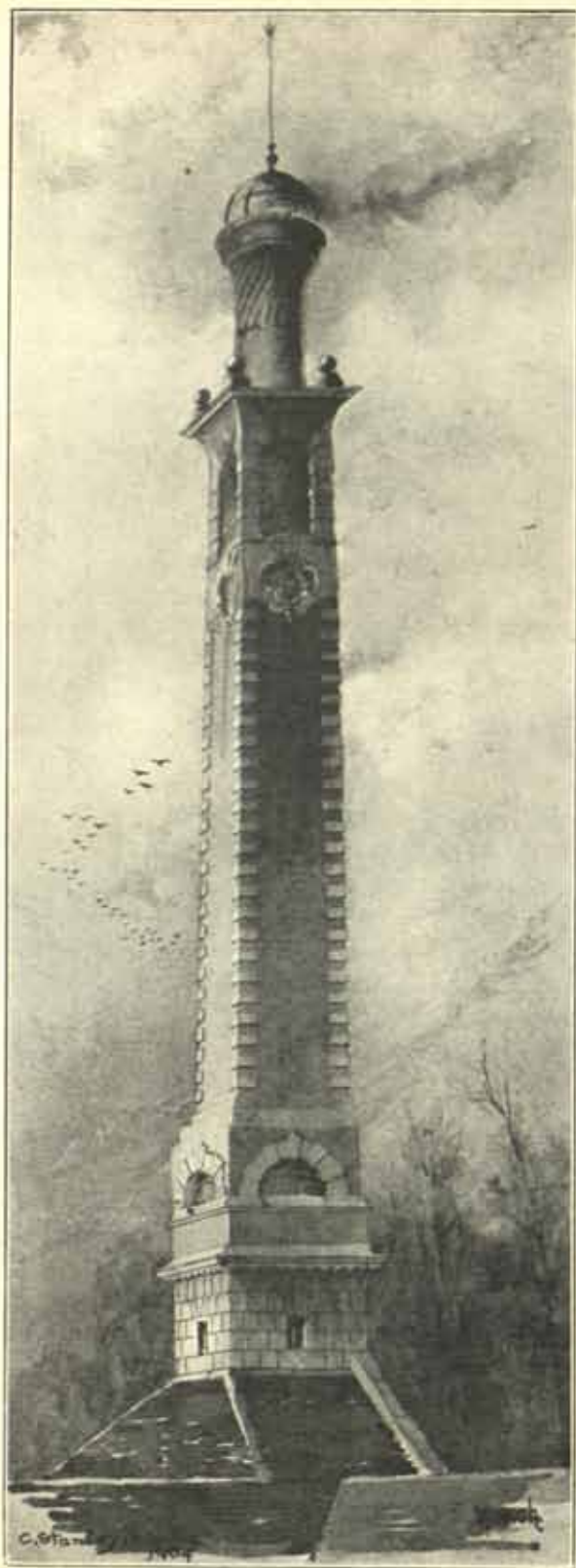


FIG. 18.—THE CHIMNEY SHAFT OF THE ELECTRIC-POWER STATION,
MUNICH, (FROM A SKETCH.)

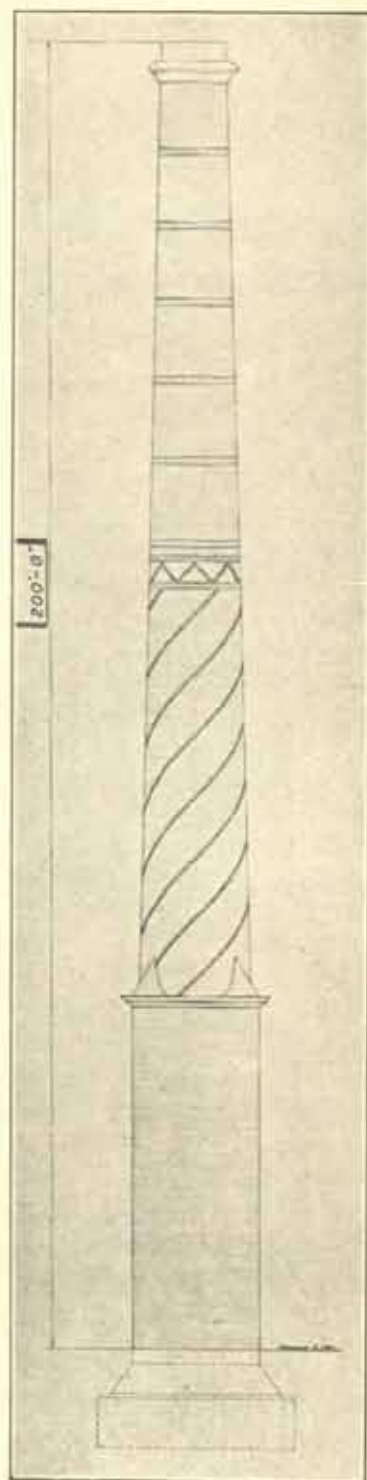


FIG. 19.—HALLE ELECTRIC-POWER STATION,
CHIMNEY SHAFT.

the most that happens to a shaft of unquestionable stability is a slight immeasurable shiver when struck repeatedly by powerful gusts of wind. In almost every case where anything like reliable evidence is forthcoming of a stack having been seen to sway, it is also proved that it was not strong enough to withstand the force of the wind acting on it, for it has either subsequently fallen, or been blown so far out of the perpendicular that it has been necessary to pull it down.

There is a common saying among steeplejacks that a heavy cap on a chimney shaft acts as a weight at the end of a lever, and so produces the destruction of the shaft. It is possible that such a thing might have happened, but it is improbable. As a rule the opposite is the case, and the so-called heavy cap has assisted in keeping an otherwise unstable shaft from falling. If the shaft has eventually failed it was because it was so insecure that even the weight of the cap could not save it. Cast-iron caps are frequently objected to as being heavy; properly designed, they are lighter than a corresponding height of brickwork. Within reasonable limits a fairly heavy cap is an advantage and not a disadvantage.

It is sometimes said that a better draught is created by a circular than by a square stack. In this case also, actual measurement shows the contrary to be the case. For stacks of equal power the evidence, on the whole, is in favour of the square stack, both as regards stability and appearance, and also as regards cost.

It remains only to summarise briefly a few matters which experience has shown are of importance in designing central stations. These buildings serve an important public purpose, and the work when once started must be carried on continuously day and night. They must therefore be incombustible in every part, and since it is not known how serious an electrical fire may be, they should be designed on the compartment or independent bay system, so that the disablement resulting from a fire may be limited. Every material can be destroyed by a powerful arc; it is, therefore, advisable to keep the main supports of the building as far away from the electric conductors as possible, especially by the switchboard. No materials which under any circumstances can burst into flame should be used, and especially the use of woodwork in both engine room and boiler house roofs should be avoided. Every department should be cut off as completely as possible from every other department, having regard to the work which is to be performed; but a sufficient number of exits, at least two, wide apart, should be provided to every department in which there are steam pipes, boilers, electrical, or moving machinery. Unequal temperatures constantly changing are unavoidable in different departments, and in many places these temperatures are very high. Ample allowance should therefore be made for expansion and contraction everywhere, especially in chimney shafts, boiler settings, main flues, and in the boiler house generally.

Vibration, varying in intensity with the type and speed of the engine, is present in all these buildings. It is not necessarily transmitted beyond the building itself, but it has been felt at a considerable distance, and many curious results have been observed. With alternating current dynamos direct coupled to engines, the effect can to some extent be regulated by the manner in which the plant is worked; but this cannot be done with continuous current or belt-driven plant. In any case it is by no means sufficient to rely on. The position, shape, size, weight, and rigidity of the foundations have a material effect on the amount of vibration which is noticeable in the building and transmitted beyond it. With some kinds of engines practically nothing which the architect can do has any appreciable effect in controlling or reducing the vibration, but with most engines a great deal can be done. Many kinds of so-called elastic, resilient, or cushion foundations have been tried, but so far none have proved successful with large engines, nor is there any evidence that vibration has been diminished by them.

Results obtained with small experimental machines are no guide to what will happen with several large machines. Foundations unevenly loaded, or fixed at one end and free at the other, and concentrated loads on girders high up in the building, increase vibration, and are apt to cause it to extend beyond the building. These are forms of construction to be avoided wherever possible. The vibration produced by a number of engines in step, or "galloping," as it is called, is frequently prevented by forming deep indents in the bottom of the foundations, and a wide area at the bottom of the engine block. Engines are frequently placed too close together, and consequently sufficient width of foundation to absorb vibration cannot be obtained. Separation of the engine foundations from the main structure is useful, but difficult to carry out effectually; but modified separation, combined with sufficient weight, spread of base, and extreme rigidity of foundations have on the whole proved to be the most efficient methods of dealing with this troublesome factor.

Repairs are expensive, difficult, and dangerous to execute, therefore only the best materials and workmanship should be used as tending both to efficiency and economy. The buildings are sure to be altered and enlarged as time goes on, whatever the first idea of the future size may be; therefore, the part first erected should be of sufficient strength to admit of this being done, without interfering with the existing building or plant installed and working.

Power stations must be erected where power can be generated cheaply, and sub-stations and direct supply stations in cities and among other buildings. Beyond some small custom which they may bring to local tradesmen, they do not, as a rule, benefit the place in which they are erected. By many they are considered worse even than motor cars, and as nuisances and abominations, standing where they ought not, more particularly when the power generated is for another district for which those dwelling in the vicinity of the station care nothing. But the value of the property in the district where the power is used is enhanced; the profits of the undertaking go to individuals who live in other places. The persons living round the station are naturally jealous, and consider themselves aggrieved, for they are inflicted with the works that others may reap the benefit. This accounts in a great measure for the hostile attitude they frequently adopt.

In designing these buildings the amenities of the locality should not be disregarded, and every care should be taken to reduce to a minimum all causes of nuisance or annoyance. The appearance of the building counts for much in these cases, and frequently sites can be obtained on favourable terms; hostility, expense, and litigation can be avoided by bearing in mind, when working out the design, that a little additional capital expenditure on the building for the benefit of the surrounding property has no prejudicial effect on the success of the undertaking, either in its early stages or later on. On the contrary, it is much more economical than purchasing property when an injunction has been obtained, or paying compensation for nuisance or the costs of a lawsuit. In the one case the only assets in return for a large entry in the balance sheet are, a good crop of ill-feeling against the undertaking, much valuable time spent on litigation which could have been better employed for advancement of the business, perhaps a learned judgment, and many bundles of papers. When the other course is followed, as at Tivoli, Munich, Geneva, and many buildings abroad—some in the United Kingdom—the capital expenditure is a negligible fraction compared with the total cost. In return, there is a profit to those earning a living in the locality, good feeling among the neighbours, a more valuable building for the owners, a reduction in the cost of maintenance, something to show that the people of this generation, while inheriting the commercial instinct of those who founded the Hanseatic League, have not lost the art of combining the useful with the æsthetic in the design of buildings of the warehouse class.

This is no Utopian dream of what might happen if these points are taken into account

in the design. They are statements of what has occurred when the two courses have been adopted in actual practice in several instances. The alternatives can be reduced to a common denominator of *£. s. d.*, and a fair comparison can and should be made when the design and estimate are being prepared.

It has only been possible to treat the subject very generally in these notes, and to give an idea of what these buildings are. No doubt opinions differ considerably on almost every point connected with them. This is only natural considering how modern they are, and how much connected with them at present rests rather on individual experience of isolated cases than on well-ascertained and widely tested data.

In central stations, as in many modern buildings, the co-operation of two professions concerned with completely different subjects is necessary, viz. building and mechanical engineering. Where such a wide difference exists no rivalry is possible, and excellent results have followed from the collaboration which has been the custom in this industry.

From the very commencement of electric supply engineers have been ceaselessly engaged in inventing, working out, and perfecting the innumerable electrical and mechanical devices and systems connected with this highly scientific subject. It has been, and it is, impossible for them to burden their minds or give up time to the consideration of the buildings. From the moment that the plant arrangement which the engineer requires has been given to the architect, the former never expects nor wishes to have anything more to do with the buildings until the architect is in a position to hand them over ready for the engineer's work to commence and plant to be erected. By this it is not to be understood that during this time the architect can work without reference to the engineer; quite the contrary. They must be in touch at every point from commencement to completion. The architect must be prepared to deal with the legal points affecting the buildings, their cost, and every part of the construction. He must appreciate what the industry is, what its developments are likely to be, and have the same intelligent general knowledge about machinery and things electrical that he would be expected to have of the fittings, appointments, and work of any other class of buildings more commonly met with in general practice.

The work of the electrician and the mechanical engineer is undoubtedly the most important, since they are concerned with working out, inventing, and perfecting the system of supply, the machinery and plant, and all that is in motion, which is the very life of the industry. The architect has but to construct the frame, which must uphold, support, and protect the vital organs, and to give some suitable outward expression of the wonderful and useful work carried on within the structure. Many of these buildings are yet to be erected, and many opportunities lie before those who realise that as men's minds widen with the process of the suns, the interest of the modern problem is to dip

" Into the future, far as human eye can see,
See the vision of the world, and all the wonders that will be."

DISCUSSION OF MR. PEACH'S PAPER.

The President, Mr. ASTON WEBB, R.A., F.S.A., in the Chair.

PROFESSOR ALEX. B. W. KENNEDY, LL.D., F.R.S., who rose at the invitation of the President, said he hoped the architectural profession were seriously taking this matter up. These stations had to come, and, if architects would

not attend to them seriously, so much the worse for the stations, and so much the worse for the public who had to look at them. As Nature had not provided water power in this country, they would have to put up with high chimneys, and if

engineers had to design them, the consequences would be too appalling to think of. He hoped, therefore, that architects would take up this subject in the spirit in which Mr. Peach had taken it up. A rather serious, though characteristic, fault he had to find with Mr. Peach's Paper. He could see nothing of his name in the whole Paper; he had said nothing whatever, in describing the buildings on the screen, as to what he had done himself. He should like to supplement this, and to have it on record that a very large number of the stations he had shown were of Mr. Peach's own design. For instance, the Westminster Electric Lighting Company, the St. James's and the Central Electric Company's stations, the County of London and Brush, that beautiful station at Ipswich, and many others which Mr. Peach had laid no claim to, though he had given ample credit to other people's work. As to the relations between engineers and architects in work of this kind, Mr. Peach had indicated them in a very satisfactory manner. The work of the two branches must necessarily be close, and neither could get on without the other if a thoroughly satisfactory result was to be obtained. He would emphasise two or three points in which engineers looked to architects to help them. He did not speak of the exterior arrangements because there they looked to architects to help them altogether. The more the engineers could be assisted by the architects in this matter the better for everybody concerned; and in one respect at least, as Mr. Peach had said, the more largely the buildings were conceived the better the financial result would be, and the more lasting would be the buildings. The question of vibration was a very serious one in buildings to be erected in towns; therefore the construction of the foundations, so as to have as little transmission of vibration as possible from the inside of the building to the outside, was one of the most important things the architect could have to consider. He was partly at the mercy of the engineer in this matter—because the engineer had to have the foundations more or less of a particular shape. But, from his own experience, perhaps the most important point in the matter of getting non-vibrating foundations, apart from the fact that they should be separate from the foundation walls, was that, if possible, they should be rather of the shape of a flat tile put down flatwise than of a brick set up on edge—that is, they should be of a shape which should offer as little chance of rocking on its own corners as possible. He had found in one or two cases of great importance that the trouble with foundations had been essentially that they were made somewhat in the shape of a brick set up on edge, very high, and, comparatively speaking, very narrow; and he had no doubt that, in certain cases, what had

happened had been that the foundations had rocked from corner to corner, and the rocking had been transmitted across streets and into neighbouring premises in a most uncomfortable fashion. The plan he thought Mr. Peach had adopted had been, after the concrete was laid in the usual way, to lay a sort of sand keys, ten or twelve feet square, with six or eight inches between in all directions; so that the bottom of the main engine foundation floor was not flat, but had a number of grooves in it, which were filled up with a non-adhesive material, separating it more or less fully from the concrete below, and making it very difficult for it to rock as a whole. He could not say that this construction had been the cause of their having had so little complaint of vibration in some of the stations Mr. Peach had put up in central London, but, if it had not been the cause, at any rate they had not had any trouble with vibration, and the foundations were constructed in that fashion. Another matter of the very greatest importance, which they were now only beginning to realise, was that they must have no combustible materials about the building. They used to say that it was sufficient if they had nothing in the building that would burn. But that was not enough now. Other buildings might burn and set the roofs of their stations on fire; and now they had to ask that architects should supply them with buildings which practically had nothing about them that would burn, no matter what wickedness the engineers were guilty of by way of trying to set them alight from inside. The construction of these huge buildings in the County of London was undoubtedly rendered much more difficult, and much more expensive, by certain conditions of the Building Act, or interpretations of the Building Act. He hoped that in time some reforms might be introduced into that Act which would allow them to deal with these buildings—which were never contemplated ten or fifteen years ago—in a more reasonable fashion. In conclusion, he could only say that members of both professions must look upon Mr. Peach's Paper as most valuable, and as a singularly complete description of matters of the greatest importance to them.

COLONEL EUSTACE BALFOUR said he was in a somewhat difficult position; though he happened to be an architect he happened also to be in a different relation to Mr. Peach, as Chairman of the St. James's Electric Light Company, and Vice-Chairman of another Electric Light Company, and also as Surveyor to the Grosvenor Estate, having a knowledge of his work on that estate. It therefore gave him very great pleasure to be able to speak on this subject, although he was not speaking just now as an architect, but rather as one having knowledge of Mr. Peach's work in electric light concerns. Some years ago he went very carefully into the question of water

power with Lord Kelvin, and he asked him whether he could by any possibility find a means of using the Scottish sea lochs for water power. Lord Kelvin replied that he had gone into his figures completely, and that it was absolutely out of the question. Therefore it might be laid down as a principle that, so far as water power was concerned in electricity, it was only in those cases where there were great rivers, like Niagara or the Zambesi, running permanently, or, in the other set of cases, like the Swiss rivers from the snow mountains, or in New Zealand from the snow mountains, that one could expect to use water power as a permanent source of energy. That meant a great deal; it meant that in North Italy, in New Zealand, and in certain parts of South Africa, an equivalent of coal existed in the snow mountains or elsewhere. That was a purely engineering point. They had also to consider how architecture was to be dealt with in these stations; and Mr. Peach had shown how the buildings should be treated. Their great problem was the problem of chimneys. Two or three months ago, Lord Wemyss, who, he believed, was a member of the Institute, came into his room at home and saw a photograph of one of those chimneys at St. John's Wood, and said it was better than the Campanile of St. Mark's at Venice! He (Col. Balfour) honestly believed that it was possible to design chimneys which would in themselves be beautiful; and he congratulated Mr. Peach on having been the first to deal with that situation, and whether successful or unsuccessful (he himself thought successful), at any rate to have tackled a problem which was as difficult a one as there could be. As regards the relations between architects and engineers, those relations became more complicated every day. They began in the days of railways, when the engineers thought they could design beautiful buildings; then they came to consider that they could not do it; and they began to try and combine with the architects. There, he thought, the Germans were a little ahead of us. The Frankfurt Railway Station, one of the most beautiful structures in Europe, was the combined work of engineers and architects. Engineers and architects ought to work together; the one to supply the artistic side, and the other the engineering. With regard to the construction of the electric light stations and the vibration in the neighbourhood, they must clearly have legislation. The present legislation, he thought, was insufficient; but that was a practical point, and somewhat outside the architectural side of the question.

MR. JOHN SLATER [F.] said he had had some little experience in building electric lighting stations, but not to anything like the extent that Mr. Stanley Peach had; moreover, those for which he was responsible were mostly in the early days of electric light, when they knew very much

less than now. He should like to echo Professor Kennedy's remarks about the extreme modesty of Mr. Peach's Paper, for he had given no indication as to which were his own buildings among those he had shown on the screen. He was quite sure that everyone would agree that they ought to pass a very sincere vote of thanks to him for the enormous trouble he had taken in bringing this subject before them. There was no doubt that if they could have water power for use in their stations it would greatly simplify matters. He had been over one of the stations at Freiberg, which was driven entirely by water power supplied by one of the small streams alluded to by Colonel Balfour; and he could not help remarking the extreme cleanliness of the whole place from the absence of coal. Here, however, we were compelled to use coal. With regard to large generating stations, he was of opinion that it was not desirable to have them in thickly populated parts of cities at all. The tendency of electric lighting companies in London had been to go beyond the crowded districts, and to get sites which would not interfere with the amenities of the neighbourhood. Several of the concerns with which Mr. Peach was connected were going further afield. The Kensington and Knightsbridge, and the Notting Hill, for both of which companies he (Mr. Slater) had built stations some years ago, had found that the nuisance of having them in the midst of crowded neighbourhoods was so great that they combined to secure a site at Shepherd's Bush, where they had erected a joint station very much on the lines of those shown them by Mr. Peach. This, of course, necessitated the construction of small distributing stations, which could be more easily brought into agreement with the surroundings than was possible with the large stations. The question of vibration which had been touched on was a very serious one indeed; if the central stations were in crowded localities trouble was almost bound to ensue. He did not think the engineers had been quite able to explain satisfactorily the curious vagaries of vibration. At the station he had built at Notting Hill, all the engines were put in a very deep basement on the hard London clay, yet they found that the vibrations affected, not the houses immediately contiguous, but those a street and a half off. That he believed had been the experience of others. They satisfied themselves at Notting Hill that the vibrations were not solely earth vibrations, but air vibrations, and no doubt those could be more satisfactorily dealt with.—Mr. Slater concluded by proposing a most hearty vote of thanks to Mr. Peach, which was seconded by Colonel Eustace Balfour.

MR. FERRANTI said he thought the Paper was intensely interesting, and most valuable both to engineers and to architects as a record of what had been done in central station practice. To

meet the wants of the present day—wants which were constantly growing—it was most valuable to have an accurate record of what had been done up to date. Such a record had been given them very fully in Mr. Peach's admirable Paper.

THE PRESIDENT suggested that the occasion afforded a good opportunity to ask Mr. Stanley Peach for any further information on the subject.

COLONEL EUSTACE BALFOUR asked if Mr. Peach would tell them something about the Berlin installation.

MR. A. MARYON WATSON [A.] asked if Mr. Peach would tell them what means they should adopt in designing the brick linings of steel shafts to allow for expansion and contraction.

MR. A. WRIGHT asked if Mr. Peach would give his impression as to the best means of dividing risks. In the case of a boiler house, for instance, it was obviously very necessary to provide against the bursting of a steam pipe, shutting down the whole boiler house; and the same sort of security should be provided for in the engine room.

MR. ALBERT GAY, M.I.E.E., asked by the President to speak, said that although the President was correct in saying that he was the author of a book upon the subject, he did not pretend to know very much about buildings. The buildings of the station he was connected with, although designed originally by himself, were completely directed by Mr. A. H. Tiltman, who must be held responsible for the thicknesses of walls, &c., which he did not pretend to know anything about. With regard to vibration, he thought that Islington, without taking any credit for it himself, had been absolutely free from any difficulty in that respect. When consulting with Mr. Tiltman about electric light buildings he (Mr. Gay) raised and most carefully considered the question of vibration, with the result that the whole of the foundations of the building were taken right down below those of the engines and plant. The foundations of the engines themselves were made, as Professor Kennedy mentioned, very wide at the bottom. They were practically monoliths, small at the top and widening out as the bottom was reached. The whole concrete foundation was erected on beach or ballast put into trays in the clay, with the result that the vibration was not transmitted in any direction to any material extent beyond the building itself. The wooden portion of the floor near to, or attached to, the foundation did, of course, vibrate slightly. One of the most serious difficulties they had had was in connection with three pumps erected almost adjacent to the church next door. The trouble was due partially to the suction pipes supplying the pumps passing through and being embedded in the wall. By putting in air vessels, and isolating

this particular section, the difficulty had been practically overcome. With regard to air concussion and vibration, a good deal of difficulty had been experienced, but it had now practically ceased. For a time they used to exhaust into the air, and the result was that the doors and windows of the surrounding premises rattled a good deal, and the people in the church clergy house complained that they could get no rest at night. By putting the exhaust into the stack the difficulty, however, was largely minimised, and was now practically abolished altogether. Another difficulty was the transmission of noise or sound. The vibrations from the alternators seem to have the peculiar property of directing themselves in a given direction and spreading themselves in a very limited direction. In a certain part of the buildings adjoining intense noise had been experienced; yet by moving two or three inches away one could get almost out of its range. It seemed to be directed in a most peculiar fashion, without respect to any particular law. At any rate, the sound vibrations were the most important of all. That, however, was being got over, and he hoped would be successfully combated.

THE PRESIDENT, in putting the vote of thanks, said he was sure they were all glad that so many of these buildings had fallen into the hands of one who had proved himself so well able to meet the problems which had confronted him. They would also be pleased that architects were taking up these buildings; he could assure Professor Kennedy that architects were always glad to take up such buildings, for they were their *raison d'être*. In this particular case there was a great architectural opportunity on account of the scale of the buildings, and the opportunity they afforded of plain wall surface. The chimneys, too, on account of their height and size, became a very important architectural feature. He had himself never been entrusted with one of these buildings, but they obviously offered great opportunities to the architect, and it must be a great pleasure for architects to work out a problem of this sort in collaboration with the engineers. It was essential from the very beginning that the engineer and the architect should work hand in hand and side by side. As Colonel Balfour had said, it had been for years the habit abroad for engineers and architects to work together, and almost all the bridges on the Continent were the work of engineers, architects, and sculptors. It had fallen to their lot at the Institute from time to time to impress upon their own local authorities that, when they had a great engineering work which was of such a position and character as to require architectural assistance, the best result would be obtained by associating the engineer and architect to work it out between them. He should like to echo

what had been already said with regard to Mr. Peach's drawings, and the modest way he had shown them to the Meeting. Only yesterday he happened to be passing the power station in St. John's Wood, and, although he would not say with Lord Wemyss that the chimney shaft was better than the Campanile of St. Mark's, still he thought it was a very fine chimney. Its great size, eighteen feet square inside at the top, made it an imposing structure, yet it looked like a chimney; and he thought that was much better than looking like the Campanile of St. Mark's. He thought it was a very useful hint of Mr. Peach's about the erection of chimneys. It was not necessary to go to very great expense in facing them with some extra good brick, which in London soon became black, but to vary it and have some other material in the upper portion, and so get the effect Mr. Peach had obtained in the station at St. John's Wood. The effect of those six chimneys in a row he thought would be very imposing, and the St. John's Wood people were doubtless looking forward to their completion! Whether it would add to the value of property around was not for him to say. Seriously, however, they had had a most interesting Paper, and they were much to be congratulated that this, almost the first Paper on the subject, should be read before the Royal Institute of British Architects. It would become, he was sure, a standard Paper, and one which would be referred to by those interested in such buildings. One thing that had struck him was the extraordinary rapidity with which the type of such buildings was being developed. Mr. Peach showed them the station in connection with the Tube (Central Railway). It seemed only the other day that the Tube was opened; but Mr. Peach spoke of it as an old-fashioned station now; so that electric science and the buildings to accommodate it were evidently advancing by leaps and bounds.

Mr. STANLEY PEACH, in responding, said that the cordiality with which the Meeting had passed the vote of thanks was particularly gratifying, as, by passing it in that way, he felt that they recognised the immense assistance and kindness he had received from architects and engineers, and the leading firms connected with the electrical industries in Europe, America, and England, in preparing the Paper. No one writing a paper could have received more assistance than he had, and when they came to read the Paper in the JOURNAL, he thought they would find many matters dealt with which had been raised in the discussion. Every effort had been made to ensure the information being as accurate as possible, and it had in nearly every case been checked by the architects and engineers of the buildings described. The drawings on exhibition were in all cases original drawings lent by the architects or engineers who designed the buildings, and who

had kindly supplied valuable information for the Paper. On the question of vibration raised during the discussion, Mr. Peach said that he had felt it was such a large subject that it would have taken an evening to go thoroughly into the various matters which arose in connection with it, and so he had not mentioned it in the abridged Paper which he had read, but it was dealt with to some extent in the Paper which would be printed. So far as aerial vibration was concerned, it could be overcome either by an expansion chamber on the exhaust pipe, or by a sufficiently large exhaust pipe carried up to a considerable height above the surrounding buildings. The matter rested practically with the engineers, and there was now very little difficulty from this cause. So far as the transmission of mechanical vibration through the foundations was concerned, this subject had been very carefully studied by those designing buildings of this class. A great number of measurements had been taken, and tests of various kinds had been made to see what steps could be taken to prevent it. Practically speaking, the best way to overcome the transmission of vibration was to put large enough foundations, as Professor Kennedy had described, and of sufficient width at the base. The foundations must also be rigid and heavy, and the load should be concentrated as far as possible at the edge of the engine block, rather than distributed in the centre. At the present time remarks on this subject should be taken rather as matters under consideration than authoritative statements based on well-ascertained and tested data. As regards the difficulty of expansion of the fire-brick lining of stacks. The lining of steel stacks is carried on angle irons, and is a comparatively simple matter, as space can be left at the top of each section under the angle iron carrying the next section to ensure room for the lining to expand; but in the case of brick shafts lined in a similar way to steel shafts, the fire-brick must be carried on in corbel courses, and it is very difficult to calculate or allow in the building the proper space for expansion, as there is considerable consolidation of the outer walls as the shaft is being built. Moreover, the fire-brick lining which is adopted in these cases is liable to bulge if not built tight up between the corbel courses, so that failure has resulted in several cases where an attempt has been made to apply the same principles of construction to brick as is used for steel shafts. The largest expansion he had ever measured in a fire-brick lining was nine inches in 100 feet; that was in the case of a stack which was cooled right down for some repairs to be carried out. The position which the top of the fire-brick lining had occupied while the stack was in work was clearly shown on the wall, so there could be no doubt about what the difference in length of the lining was between the stack hot and cold. In the Paper they would find a great

deal more information than he had given that evening, and if they had patience to read it he hoped they would find several points which would be generally useful not only for central stations, but in general practice.

LIST OF PLATES.

[Inserted between pages 308 and 309.]

- PLATE
I. & II. Power Station of the Central Electric Supply Co. Ltd., Grove Road, St. John's Wood, London: Plan, elevation, and sections.
- III. Power Station of the Underground Electric Railways of London, Ltd., Lot's Road, Chelsea: Plan and section.
- IV. Power Station of the Corporation of Manchester, Stuart Street: General plans and sections.
- V. Power Station of the Corporation of Dublin, Pigeon House Fort: Plan and section.
- VI. & VII. Power House of the Third Avenue Railroad Co., Kingsbridge, New York: Plans, elevation, and sections.
- VIII. & IX. Power Station of the Municipality of Vienna: Plan and section.
- X. Berliner Electricitäts Werke, Ober-Spree, Berlin: Plan and section.
- XI. & XII. A. Municipal Station at Amsterdam: Plan of building and section of foundations.
- XII. Sub-station with Garden over of the Westminster Electric Supply Corporation, Duke Street, Mayfair, London: Geometrical drawings.
- XIII. Sub-station No. 6 of the Manhattan Elevated Railways Co. of New York, and Sub-station of the Municipality of Vienna: Plans and sections.
- XIV. Manchester Sub-station, and First Power Station of the Municipality of Geneva: Plans and sections.
- XV. & XVI. Second Water Power Station of the Municipality of Geneva at Chèvres, and the Bennett Street Sub-station of the Manchester Corporation: Plans and sections.
- XVII. Direct Supply Station of the County of London and Brush Provincial Electric Light Company, Ltd., City Road, London: Plan.
- XVIII. Direct Supply Station of the Borough Council of Battersea, London: Plan and transverse section.
- XIX. & XX. Composite Supply Station of the Corporation of Ipswich: Plan and section.



9, CONDUIT STREET, LONDON, W., 2nd April 1904.

CHRONICLE.

Special Elections to Fellowship.

The Council have elected the following gentlemen to Fellowship of the Institute under the proviso to By-law 9, viz. :—

JOHN KEPPIE, of 140 Bath Street, Glasgow, *President-Elect of the Glasgow Institute of Architects*, elected 14th March.

HENRY LANGTON GODDARD [A.], M.A.Oxon., of 8 Market Street, Leicester, *President-Elect of the Leicester and Leicestershire Society of Architects*, elected 28th March.

Photographic Competition.

Mr. Gilbert H. Lovegrove, Hon. Sec. A.A. Camera and Cycling Club, asks notification in the JOURNAL of a photographic competition, open to members of the architectural profession, to be held under the auspices of the Club. The following are the rules :

1. The competition is confined to sets of photographs adapted for the purpose of architectural study.
2. The competition is open to members of the architectural profession, and all members of the Architectural Association.
3. Each set should consist of not more than twelve prints, and illustrate one subject or class of subjects.
4. A competitor may submit any number of sets.
5. The whole of the work in connection with the photographs submitted must have been carried out by the competitor.
6. Photographs must be sent to the Secretary of the Architectural Association Camera and Cycling Club, at the offices of the Architectural Association, not later than the 1st October, and must be mounted, but not framed.
7. The photographs will be approved by the Committee of the Architectural Association Camera and Cycling Club as having reached a fair standard of technical excellence, and will then be finally adjudged by a gentleman, not a photographer, who is an expert in architectural tuition, and who will be chosen by the President of the Architectural Association. Such name to be declared before the end of March.
8. Copies of the winning prints, by a permanent process, must be deposited with the Architectural Association before the prize is presented to the winner.
9. The Architectural Association and the Architectural

Association Camera and Cycling Club will not be responsible for any loss or damage to any prints entered for the competition, nor for any charges for carriage, &c.

10. A prize value three guineas will be awarded to the best set of prints, and will take the form of books or apparatus.

Mr. E. Guy Dawber [F.] is to be judge.

House of Commons Committee on Ventilation.

A series of articles from the *Building News*, purporting to be an analysis of the Report of the Select Committee on the Ventilation of the House of Commons, has been published in pamphlet form [Hickson, Ward & Co., Chiswell Street, E.C.: price 1s.]. The Select Committee consisted of Sir Michael Foster, F.R.S., *Chairman*, Sir J. Batty Tuke, M.D., Messrs. Robert Farquharson, M.D., Victor Cavendish, John Dillon, D. F. Goddard, and A. H. Smith. The pamphlet may be seen in the Library.

The late John Gibson.

The bust of the late John Gibson, kindly presented to the Institute by Mr. William Glover [F.], has been placed in the lobby at the foot of the staircase leading to the Library. The bust was modelled by the late Mr. Bursill, a Royal Academy Medallist and Travelling Student, who executed the bronze statues on Holborn Viaduct, and the figures and panels at the National Provincial Bank in Bishopsgate Street.

John Gibson [b. 1817, d. 1893] was elected Associate of the Institute in

1849 and Fellow in 1853. He served for many years on the Council and as Vice-President, and received the Royal Gold Medal for Architecture in 1890. He was a pupil of Sir Charles Barry, and on the completion of his articles remained with him as assistant for some years, his work being almost exclusively confined to the drawings and works connected with the Houses of Parliament. Commencing practice in 1844 he won his first success in the competition for the buildings of the National Bank of Scotland at Glasgow. Others of his early works were the

Imperial Fire and Life Office, Threadneedle Street; the twin-spired Romanesque Chapel in Bloomsbury, erected in 1847; the Imperial Insurance Company's office at the corner of Old Broad Street; several buildings in Warwickshire, such as Compton Verney, for Lord Willoughby de Broke; Wroxton Abbey; Charlecote Park; Guy's Cliff, and several churches. Bodleywyddan Church, erected in 1860 for Lord Willoughby de Broke, was considered the finest of Gibson's ecclesiastical works. In 1864 he was appointed architect to the National Provincial Bank of England, and built for it the head office in Threadneedle Street, the branch bank in Piccadilly, and upwards of forty other branches in different parts of the country. Other notable London buildings of his were Child's Bank in Fleet Street, and the premises of the Society for Promoting Christian Knowledge, the first building erected in Northumberland Avenue,



BUST OF JOHN GIBSON [F.], ROYAL GOLD MEDALLIST 1890, MODELLED BY H. BURSILL AND EXECUTED BY JOHN UNDERWOOD IN 1888.

PRESENTED TO THE COUNCIL IN 1904 BY WILLIAM GLOVER [F.], PAST PRESIDENT OF THE NORTHERN ARCHITECTURAL ASSOCIATION.

The Coal Smoke Abatement Society.

At the annual general meeting of this Society, held on Tuesday, 22nd ult., the Chairman, Sir William Richmond, K.C.B., R.A., in proposing the adoption of the report, said that the amount of work done by the Society in the past year was very considerable. From 1st January to 31st December the Society's inspector reported 2,000 observations of smoke pollution, which led to the detection of 1,460 cases of nuisance, and upon those observations 1,278 complaints were forwarded to the various metropolitan local authorities. Following those complaints forty summonses were issued under the Act, involving the offending firms in penalties and costs. The Committee had been able to draw up a list of sixty-eight firms who, before the Society exerted and made itself felt, habitually polluted the atmosphere of our city with one or more chimneys, and whose works within the past six months had not been observed to emit any smoke at all. Considering that all this work had been done with only one inspector, it might be taken as a great achievement. Before the Society was founded none of the London boroughs paid any attention to the clause in the Public Health Act relating to pollution of the atmosphere by smoke. The London County Council took no action in the matter, and the borough councils refused to obey the law. When the Society was started it was determined to proceed in the simplest way, and, instead of trying to frame a new law, to try and get the existing law put into operation. They were now in co-operation with almost all the borough councils in London and with the London County Council, and at the instance of the Society the latter body was meditating a most desirable scheme, viz. to fine offenders £10 for the first offence, the fine to be doubled on a recurrence of the nuisance. The City of Westminster was in harmony with the desires of the Society, and he was pleased to find that they were able to prosecute clubs for emitting black smoke. West Ham was a very great factor in the smoke nuisance question; the sanitary authorities of that place had been very remiss in the performance of their duties, and although they had received from the Society 572 observations, the borough councils had refused to act. The Society were now taking the matter into stronger hands, and had appealed to the Local Government Board to perform the duties which the borough councils ought to do. With regard to domestic grates, there was no doubt that they could get rid of the smoke from that source if they chose, but the Society would rather press the question of the manufacturer first.

The report having been adopted, the following resolutions were passed:—

"That the pollution of the air by coal smoke is injurious to public health and vitality, destructive

to works of art and vegetation, and directly demoralising to the inhabitants of a great city."

"That this meeting, in recognising the practical results already achieved by the Coal Smoke Abatement Society with the limited resources at its disposal, and in approving of its line of action, pledges itself to use its best endeavours to place it in a position to extend its operations."

An Architect's Memorial.

From Mr. HENRY LOVEGROVE [A.]—

In the Parish Church of St. Mary, Islington, now being altered by Sir Arthur Blomfield & Sons, many of the old memorial tablets are being re-fixed. At the East end of the South gallery a tablet ornamented by a T square and plumb rule bears the inscription:

IN MEMORY OF
MR. LANCELOT DOWBRIGGIN
CITIZEN AND JOINER OF LONDON
DIED JULY 24TH, 1759, AGED 70 YEARS.
ARCHITECT TO THIS CHURCH
IN THE YEAR 1754.

THE REGISTRATION OF ARCHITECTS.

46, Lincoln's Inn Fields, London, W.C.,
22nd March 1904.

To the Editor of the JOURNAL OF THE ROYAL
INSTITUTE OF BRITISH ARCHITECTS,—

SIR,—Professor Beresford Pite's lecture on this subject published in the JOURNAL of the 5th March contains the best definition of the art of architecture with which I am acquainted. If, however, his deductions therefrom are sound the Institute principle of compulsory examinations for membership and its system of examinations stand condemned and should at once be swept away. It is for the members, and especially for the Associate members, to say whether they are prepared to regard the Professor's logic as irrefragable, and further whether, in that case, it is expedient to take so retrograde a step.

As regards his assumption that until some other Bill is before the Institute that drafted by the Registration Act Committee many years ago must form the basis of the discussion of the R.I.B.A. Registration Committee as to the practicability of the statutory training of architects, we would observe, first, that the main principles of a Registration Act have been conceded by, and have governed, the procedure of the Institute for many years; and, secondly, that provided a majority of the members desire the maintenance of these principles and their extension to the profession generally, it becomes the imperative duty of the Institute Council to draft a new Bill which, while avoiding any points in the existing Bill they may consider detrimental, either to the art of archi-

teature, to the profession, or to the interests of the public, will best secure the end aimed at, viz. the adequate education of all architects and the penalising of unqualified and unworthy practitioners, and will safeguard the various interests involved.

The remaining arguments of Professor Pite's lecture appear to resolve themselves into this, namely, that it is impossible to qualify a man by any system of education to practise architecture because the only test of an architect's qualification is his executed work!

As regards the structural side of architecture he urges that it is not proposed to test civil engineers, forgetting apparently that the Institution of Civil Engineers comprises practically all practitioners of any standing, and is closed by a very severe scientific examination.

His contention that the attempt to test a man's knowledge of building construction, his skill in draughtsmanship, and capacity to design will lower the ultimate standard of professional attainment can only be made good by undeniable evidence that the qualifications of the Associate members of the Institute are lower than they would have been had they not been obliged to pass the examinations.

The advocates of registration have never overlooked the interests of architecture as a fine art. It only remains to reply to the assertion that in all such subjects as history, ornament, and design it is inevitable that the sanction of penalties should involve the easing of the standard of education, and that we cannot afford to encourage lax training at the present time. We ask, can any instance be quoted in which the system of compulsory qualification has led to the lowering of the standard of education? The contrary has invariably occurred.

The present examinations of the Institute are a compromise between the voluntary and the compulsory systems, and like most compromises they fail to effect the desired end of educating the profession generally.—Yours faithfully,

W. H. SETH-SMITH.

REVIEWS.

ST. PATRICK'S, DUBLIN.

The Cathedral Church of St. Patrick. A History and Description of the Building, with a short Account of the Deans. By J. H. Bernard, D.D., Dean of St. Patrick's. Price 1s. 6d. [London: George Bell & Sons, 1903].

From the "Land of the Saints" has come the latest addition to Bell's Cathedral Series, in a most admirably concise and interesting history of St. Patrick's Cathedral, Dublin. It is a work which will commend itself, not merely as a convenient handbook to the casual visitor, but as an

historical record it will be of considerable value to the archaeologist and architect. In his preface note, the author, Dean Bernard, refers to an extant work on the same subject which, though indispensable to the historian, he considers of little use to the student of architecture, as the writer had no special knowledge of that subject. Dean Bernard has had the wisdom, therefore, in the preparation of the present work, to seek the assistance of the cathedral architect, Sir Thomas Drew, to whom is probably due much of the interesting and detailed description which the book contains of the many vicissitudes through which the fabric passed from its earliest history to its restoration by the beneficence of the Guinness family.

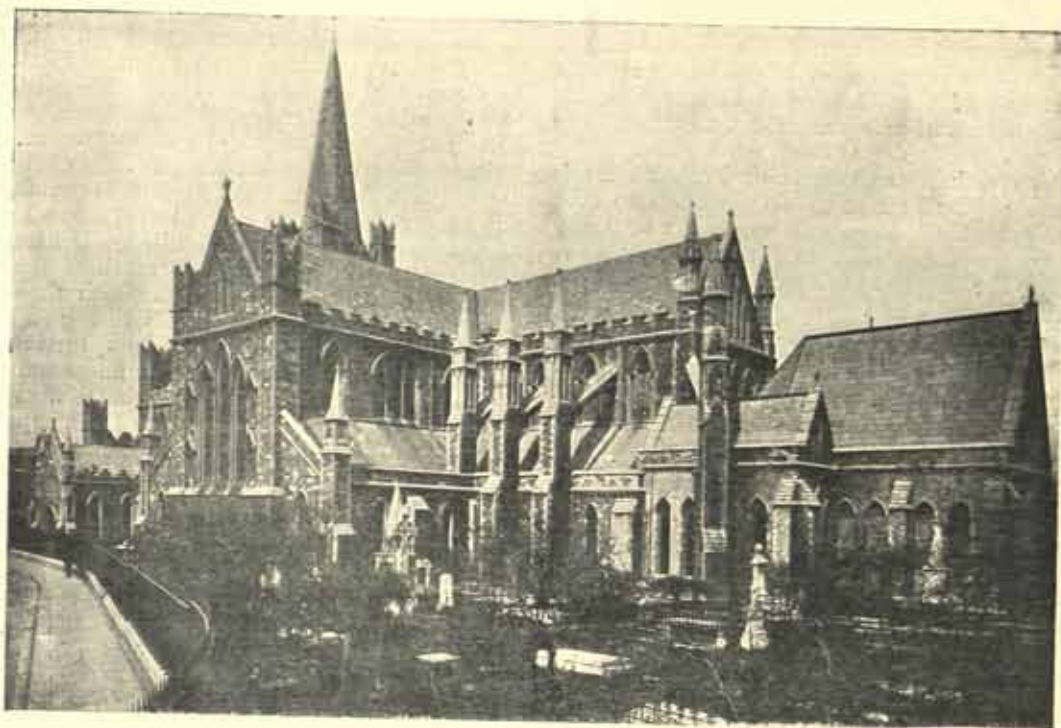
The author is evidently quite at home with his subject, which he has treated with the sympathy befitting an Irishman when writing the history of a church so intimately associated with memories of the national tutelary saint. The exact site of the well in which that saint baptised the people on his first coming to Dublin has, according to Dean Bernard, "been determined to a high degree of probability"; and a stone, marked with an ancient Celtic cross, has been discovered close to the north-west corner of the nave; concerning which it is stated "that there is no reasonable cause for doubting that this stone originally stood over St. Patrick's Well, and that it dates from the ninth or tenth century at latest."

To the peculiar sanctity in which this site was held, by virtue of its association with the name of St. Patrick, is ascribed its selection for the cathedral building. The choice would appear to have been a most unfortunate one, for it was on the marshes of the Poddle River, and "all through its history the lack of a crypt and the moist clay of the foundations, through which springs continually flow, have been injurious to the fabric."

The exterior of the cathedral and its precincts, as well as the interior as it at present exists, are described in considerable detail, and some interesting information is given in the chapter on the "Historical Memorials" concerning notable services which have been held in the cathedral. One such took place on the 27th January 1660, to inaugurate the Restoration, at which twelve bishops were consecrated by Archbishop Bramhall, the sermon being preached by Jeremy Taylor, Bishop-elect of Down and Connor. The anthem was composed by the Dean (Fuller), the chorus being as follows:—

Angels, look down, and joy to see,
Like that above, a monarchie.
Angels, look down, and joy to see,
Like that above, an hierarchie.

There are naturally many allusions throughout the book to Jonathan Swift, the most famous of the deans of St. Patrick's. His pulpit still stands in the nave of the cathedral, his bust is close to the door leading to the robing-room, and his opinions con-



ST. PATRICK'S CATHEDRAL, DUBLIN.

cerning some of his predecessors are inscribed in vigorous but decidedly unparliamentary language on more than one lease preserved in the archives. Across a lease, for instance, issued in the name of one Bassenet (a namesake of a former dean) Swift has written that he "was kin to that scoundrel who surrendered the deanery to that beast Henry VIII."

As a record of careful and intelligent restoration, the book will be appreciated by all students of architecture. It is of convenient size, and is profusely illustrated by excellent reproductions from sketches and photographs.

Dublin.

FREDERICK BATCHELOR.

BRICKWORK AND MASONRY.

Brickwork and Masonry. A Practical Text-book for Students and those engaged in the Design and Execution of Structures in Brick and Stone. By C. F. Mitchell and G. A. Mitchell. 80, Lond. 1904. [B. T. Batsford, 94 High Holborn.]

As the authors point out in the preface, "much of the subject-matter is contained in their works on building construction; but it has here been correlated, revised, and extended." The branches more fully dealt with in this volume are: retaining walls, domes and vaulting, arches and bridges.

In *Brickwork*, besides the usual notes on foundations, bonding, and the construction of flues, special articles are devoted to the construction of tall chimneys and brick sewers. In *Masonry* all

the technical terms are explained, and the various methods of building and dressing stonework carefully defined.

In addition to these subjects, special chapters are devoted to concrete, limes, and cement, and the methods of measuring excavators', bricklayers', and masons' work are generally dealt with. The various kinds of brick and stone generally used are classified and their characteristics given.

The authors give tables of safe loads, strength and weight of materials, thicknesses of walls, &c., which will be found useful, also various examination questions which have been set by different authorities during recent years, and the volume is well illustrated by numerous diagrams and details. It is a book which will prove of great assistance to the student in building construction.

F. DARE CLAPHAM.

ALLIED SOCIETIES.

THE GLASGOW INSTITUTE.

Dinner to Mr. J. Honeyman, LL.D., R.S.A.

On 10th March, at the Grosvenor Hotel, Gordon Street, members of the Glasgow Institute gave a complimentary dinner to Mr. John Honeyman, R.S.A., in testimony of their appreciation of his half-century of professional life. Besides members of the Institute there were present Mr. W. I.

Blain, the President of the Glasgow Architectural Association, Mr. F. H. Newbery, head master of the Glasgow School of Art, and Mr. Crawford, the President of the Glasgow Art Club.

In proposing the toast of the evening the President, Mr. Horatio K. Bromhead [F.], said that never had honour been more deserved by any Glasgow architect, and they had great pleasure in thus conveying to him their congratulations on his jubilee of fifty years' practice on his own account in Glasgow. Mr. Honeyman commenced practice in 1854, and he (the President) could testify to the great kindness which he personally received from him. It would be pleasant to refer to Mr. Honeyman's numerous works, but he would only touch lightly upon one or two. No one with knowledge could look upon Brechin Cathedral without being impressed with the delightful combination of profound knowledge and exquisite care and judgment displayed in its restoration. Nor could the student fail to delight in the beauties of Skipness Castle, or help being struck with admiration at the superb manner in which every detail had been supervised by one who revelled in the chaste loveliness of Scottish baronial architecture. These two examples were characteristic of the common sense which marked all his work. Avoiding the endeavour to be too original, he never went to the other extreme of dull monotony and of slavishly copying existing works. Amid his professional work Mr. Honeyman found time for archæology, and was prominent in connection with the formation of the Archæological Society in 1855. In the early years of his (Mr. Bromhead's) connection with the R.I.B.A. it was seldom convenient to attend the meetings in London, and he considered himself fortunate in being present at a meeting in 1874, and hearing the President, the late Sir Gilbert Scott, the architect of Glasgow University, say how pleased they were at having in Mr. Honeyman a second member from Glasgow and a fourth from Scotland joining the Institute. The R.I.B.A. had now 68 members in Scotland. In 1876 Mr. Honeyman was elected a member of the Council of the R.I.B.A., and was re-elected in 1878 and 1884. He was one of the original members of the Glasgow Institute of Architects, and held the office of a member of Council in 1869 and 1870, and from 1874 to 1883. He was Vice-President from 1876 to 1878, and President in 1881 and 1882. In 1889 he retired from the Glasgow Institute, and in 1900 was elected an honorary member.

Mr. Campbell Douglas [F.] and Mr. Keppie [F.] also spoke to the toast, which was received with great enthusiasm.

Mr. Honeyman, in replying, expressed the difficulty he felt in finding suitable words to acknowledge the enormous kindness which had been exhibited towards him. In referring to the very limited means of architectural training that

existed in his earlier years, and to his having studied in London before he commenced in Glasgow, he said that he had always been deeply interested in the educational schemes of the R.I.B.A.; and while he approved of the examination for Associates, he also believed in a discretionary power, on the part of the Council of the Institute, in the election of Fellows.

LEEDS AND YORKSHIRE SOCIETY.

The Retiring President's Address.

The last meeting of the session was held in the Society's rooms on March 24th, Mr. Butler Wilson [F.] presiding. The officers and council elected for the ensuing year were as follows:—President, Mr. G. Bertram Bulmer [F.]; Vice-Presidents, Mr. H. S. Chorley [A.] and Mr. W. G. Smithson [A.]; Hon. Secretary, Mr. Robert P. Oglesby; Hon. Treasurer, Mr. W. H. Thorp [F.]; Hon. Librarian, Mr. G. F. Bowman; Council, Mr. R. Wood, Mr. C. B. Howdill [A.], Mr. Percy Robinson, Mr. T. E. Marshall (Harrogate), Mr. F. Musto [A.], and Mr. G. E. Reason (Associate Member).

At the conclusion of the business, the retiring President, Mr. Butler Wilson, in addressing the meeting, said:—GENTLEMEN,—After occupying this chair for three successive years, I take occasion at this our last sessional meeting to tender my best thanks to the officers and council not only for their great kindness to me but also for the ever-ready help and assistance which they have accorded to me in the conduct of the affairs of this society. Events of considerable importance both to this city and to the profession generally have been dealt with by them, and their time and labour have been given to these objects with an unsparing hand. I feel confident that my successor, Mr. Bulmer, will receive the same hearty support in his duties that it has been my happy lot to experience. He filled the office of president in former years, and the efficient manner in which his duties were then exercised is sufficient guarantee that he will bring to bear upon his renewed responsibilities the same energy and ability which he then displayed. It is matter for congratulation that he is a staunch supporter of statutory qualification under the auspices of the Royal Institute of British Architects. As you know, I had the honour in January last to give notice that I should move certain resolutions bearing upon this question, and I was supported at the Institute on that occasion by a number of Presidents of Allied Societies. A careful estimate of the composition of the meeting was made by metropolitan supporters of the movement, and I was assured that there was not present the two-thirds majority necessary to carry the first resolution, which was of an uncompromising character, viz.: "That this Institute is in favour of the statutory registration of qualified architects." I determined,

therefore, to withdraw the first resolution as above, but not before I had a definite and authoritative assurance that my second resolution, to appoint a committee, would be permitted to go forward in the form of an amendment. This was done, but as Mr. Macvicar Anderson proposed a further amendment, which, as a matter of fact, gave me even better terms, viz. that all the Allied Societies should be represented on the committee, I at once withdrew in his favour. That committee, formed on the motion of a past-president, has now met and consists of an equal number of metropolitan and provincial members. My action in withdrawing my first motion has thus been completely justified by the very satisfactory result obtained. Had the first motion been put to the meeting and defeated, the accomplishment of our object might have been postponed for some years. I had in my mind what occurred at the Institute thirteen years ago when a similarly blunt resolution was persisted in with disastrous results. This piece of history I did not wish repeated. As showing the trend of professional feeling, it gives us great pleasure to know that an architect whose work we all admire, Mr. Guy Dawber, President-elect of the Architectural Association, has become a supporter of this movement. Moreover, an independent committee of London members of the Institute has recently been formed, with statutory qualification as its object, and contains names which traverse the idea, which it has been attempted to put forward, that the movement wins no sympathy from the aesthetic element within our profession.

On the motion of Mr. G. F. Bowman, seconded by Mr. G. Bertram Bulmer [F.], President-elect, and supported by Mr. W. H. Thorp [F.] and others, a high tribute was paid to Mr. Butler Wilson for the admirable work he had accomplished during his three years' presidency, together with an appreciation of his energy and zeal in the cause of the affairs of the Society. Mr. H. S. Chorley [A.], the retiring Honorary Secretary, was also complimented upon his efficient conduct of an onerous position on the motion of Mr. Robert P. Oglesby.

Mr. Starkie Gardner then read a Paper on "Architecture in Lead," which was much appreciated by the members.

THE NORTHERN ASSOCIATION.

Annual Report.

The Annual Report for the Forty-fifth Session states that there are sixty-nine members, seventy-two Associates, and seventy-eight students, or 219 in all, an increase of sixteen during the year. The report sets out in full the trust deed for the administration of the sum of £1,500 presented to the Association by Mr. Wm. Glover. The money is invested, and Mr. J. Walton Taylor, *President*, and Mr. A. B. Plummer, *Hon. Secretary*, have consented to act as trustees. The income of

£1,000 is to be applied for the educational work of the Association. It is proposed to found a Travelling Studentship, to be called the "Glover Travelling Studentship," and to institute a Medal, to be called the "Glover Medal" and to be awarded to student members for works of exceptional merit; prizes, fees for lectures, and additions to the Library are also proposed. The deed provides for the investment of the remaining £500 and accumulation of interest with the ultimate object of acquiring permanent offices for the Association. The question of borough surveyors carrying out architectural work has been under consideration by the Council, and Mr. A. B. Plummer endeavoured to ascertain what was thought by other societies on the subject. It was found that in some cases borough engineers have architects under them in their offices. The Sheffield Society stated that they have been able to influence their City Council to some extent against a similar state of affairs. In Leeds work of an architectural character is not so often entrusted to the city engineer as formerly. The Town Council of Leicester have resolved to put all works costing more than £500 into the hands of architects. In some rural districts the district engineers and surveyors not only carry out architects' work for the district councils, but they are allowed "private practice," and have, therefore, practically to recommend their Councils to pass their own plans, and other architects are placed at a disadvantage with those who would otherwise be their clients. The grievance was brought under the notice of the R.I.B.A. Council, and the reply was that a large committee had been formed, including all the Presidents of Allied Societies, to go thoroughly into the question.

MINUTES. XI.

At the Eleventh General Meeting (Ordinary) of the Session 1903-04, held Monday, 28th March 1904, at 8 p.m.—Present: Mr. Aston Webb, R.A., F.S.A., *President*, in the chair, 36 Fellows (including 11 members of the Council), 42 Associates (including 2 members of the Council), and numerous visitors: the Minutes of the Meeting held 14th March 1904 [p. 277] were taken as read and signed as correct.

The following members attending for the first time since their election were formally admitted by the President—viz. Arthur Benjamin Plummer (Newcastle-on-Tyne) and Arthur Keen, *Fellows*; Henry Arthur Battley, Horace William Cubitt, William Robert Davidge, Harold Griffiths, Henry Blinman Mackenzie, *Associates*.

A Paper by Mr. Charles Stanley Peach [F.], entitled NOTES ON THE DESIGN AND CONSTRUCTION OF BUILDINGS CONNECTED WITH THE GENERATION AND SUPPLY OF ELECTRICITY KNOWN AS CENTRAL STATIONS, having been read by the author and illustrated by lantern views and by plans and working drawings of the buildings referred to, a discussion ensued, and a vote of thanks was passed to Mr. Peach by acclamation.

The proceedings then closed, and the Meeting separated at 10 p.m.



Wells: Effigy in South Aisle of Choir.

THE STATUES OF WELLS, WITH SOME CONTEMPORARY FOREIGN EXAMPLES.

By EDWARD S. PRIOR, M.A. Cantab.

Read before the Royal Institute of British Architects, Monday, 18th April 1904.

IT is not necessary for me to say much of the very high value which is the possession of English art in the statues of Wells front. It is an acknowledged value of many kinds, and our good fortune in it can hardly be exaggerated. These statues have escaped the chances which have been almost everywhere destructive to mediæval sculpture—they have not been largely defaced by iconoclastic or political riot; they still possess their heads, arms, and their main features unbroken; the face of the stone has not completely perished as so much of English building stone has done, and in the pure air of a West-country town it has been but little coated with dirt; and then, as a crowning mercy, the restorer has not restored our statues away with that merciless practical joke of his which, while it fills the niches, blackens the memory of mediæval art.

What we have got at Wells may be gauged by thinking from what we have been preserved, such as a visit to some other cathedrals will press home upon us. Wells shares with Exeter the rare distinction of not having had its façade disfigured by wholesale introductions of the sham mediæval figure. What if Bishop Jocelyn's front were as Salisbury front is now: statued as Lichfield and Canterbury have been: or "restored" as York is being restored! It is with outraged senses and indignant protest against the incompetent guardianship of Deans and Chapters, against the cruelty of restoration committees, that we approach the fronts of most of our cathedrals. But at Wells we can go calmly and thankfully to the consideration of the art of our forefathers.

And fortunate, too, are these Wells statues that they stand in their original setting, though here we have to deplore the bad taste of the restoring mania in not a few unwise substitutions. But at any rate the statues of Wells stand in the places where their sculptors set them; we see them not as exhibition specimens in the arid atmosphere of museum display, but still part of the living body of architecture—the blossom upon the tree of art—in the beauty of its growth. Still, as the setting sun lights up this grey front, we can recover the memory of its first splendour, can with easy imagination see it glorious and gracious, a mighty jewelled iconostasis, arrayed with golden bright-robed figures—the innumerable company of the saints.

And that these fortunately preserved statues are of the date and style which they are is specially fortunate, for this date and style make them not only interesting and beautiful,

but of all our statues the most historically valuable. For they belong to that fresh, early period of Gothic art when its expression seems to leap upward like a flame; when, in the heat of it, art ran molten into the moulds of new motives; when the image and superscription that for the thousand years of the Byzantine dynasty had been the currency of art were in a couple of generations entirely coined afresh—minted, as it were, for the Gothic dynasty. We can see in the Wells statues the genesis of a dominant art, the triumphant progress that marks the creation of a great style, till in the latest and best of our Wells figures has been reached the highest level of the English accomplishment. Indeed, when we consider the quality and the number of the statues, and their fair preservation, compared with the scantiness, the disfigurements, and the restorations of nearly all our English mediæval figure-work, we might say that with the loss of Wells would go one half of our noblest art. Only conjecture and tradition would remain for its greatest credit as to sculpture. It would be as if the *Iliad* and the *Odyssey* were gone, and only the *Homeric Hymns* could be produced as proofs of Greek epic genius.

Clearly the subject of my lecture has many sides, and I have neither the time nor the capacity to discuss them. My efforts must be confined to developing certain views upon only one aspect of the Wells statues, which circumstances have brought to my notice. The reason of my addressing you is really the occasion that has lately been afforded to the student of the Wells statues by the erection of a scaffolding during the past year upon the west front. Thirty-three years have passed since from the scaffoldings set up for the restoration of the front archæologists last had the means of making close acquaintance with the statues. At that time a valuable series of photographs was taken by the Architectural Publication Association and Mr. Phillips, of Wells, and these have been the best sources of information on many points. Last year one of the figures at the north-west angle [fig. 11] fell to the ground (pushed out by the accumulation of dirt behind it), and it was wisely determined to make a general overhaul of the statues, and by cramps and hold-fasts safeguard them against such accidents. From the scaffoldings erected for this purpose Mr. St. John Hope has been able to examine all the statues at close quarters, and has made now a complete schedule of them, with note of the character and attribute of each, and every detail of attitude and symbol attaching to them. At the same time a complete new series of photographs has been executed for the Society of Antiquaries. Professor Lethaby has joined with Mr. St. John Hope in a consideration of the evidences that are so to hand as to the scheme of the statues. For the first time their identifications will be scientifically discussed at competent hands, and we may confidently hope that the main questions of iconography will now be authoritatively settled, and the import of these arrays of statues brought out of the fog of well-intentioned conjecture which has enveloped them. We shall have some certain ascriptions instead of the imaginary titles with which Cockerell and others have labelled them.

My part to-night is, however, to turn from the valuable and attractive enterprise of naming the statues to a less exciting but still I think interesting side of their sculpture. The scaffolding has given opportunity of observing at close quarters not only the matter of the portrayal but *its manner*, and has enabled my friend Mr. Arthur Gardner to make photographic studies which the lantern will put before you to-night. As preliminary to this, I should wish to make a short survey of the points we wish to develop.

The art of the statuary in stone is the art of his chisel. His craft lies in the cutting edge of the implement with which he shapes and models his stone. Now our point is, that the consideration of that use of the chisel gives the key to the history of English sculpture. In the simple action of cutting stone lies a world of diversity, in which can be mapped out territories of style, as clearly as in the world of nature are mapped out the regions of

distribution for animal life. The variations in the technique of a craft grow and spread under the same class of laws—those of heredity and variation, which have created in different districts the characteristic fauna and flora of each. For these variations have never been matters of arbitrary invention or designing, but exhibit themselves under the conditions of a coherent growth, having definite forebears behind them, and an acknowledged progeny in front. So that even in such a straightforward matter as the plain dressing and walling of freestone, the date and style of the masons were expressing themselves all through the Middle



FIG. 1.—THE MADONNA OF CENTRAL DOORWAY.

Ages, and this expression can be traced from one period to another by the variations in what are the simplest actions of building, the finishing and setting of the stone employed.

Certain and fully expressive of date and style is the signature of the figure sculptor in his use of the chisel point upon his statue—no doubt an individual signature, but not so much one of individual fancy and caprice as the expression of his time, showing a growth from one stage of execution to another, and with distinct peculiarities arising from the phases of his craft, from the traditions of his age, from the texture of the stone he uses, from the commerce and connections of the habitat in which he works. The sculptural representation of the human figure can be seen, indeed, to be a field in which conventions *must* develop themselves, and in the utterance and accent of these conventions lie a thousand styles. All the features—eyes, mouth, ears, hair, hands, feet—can be expressed in sculpture under endless diversities, with this or that indicated and this or that suppressed, with now one kind of *vraisemblance* and with now another: and so on with drapery and its ornament, its rest, its movement, its folding and its texture; all these have countless properties, none of which can be completely represented in sculpture, but which can be suggested now this way and now that. And that the necessary conventions for this suggestion are put this



FIG. 2.—COLOCUTION OF THE VIRGIN.

way and not that, or in another way, is a writing which declares the time, the training, the nationality of the sculptor. His chisel conventions are his native tongue. From the consideration of them we may say he is Englishman, Frenchman, Italian, or German, that his craft has grown up in working upon this or that stone, that he was living at a certain

date, and had in fact a certain position in the history of English, French, Italian, or German building-art.

To endeavour to bring this before you with regard to the sculptors of the statues at Wells is my object to-night, for Wells Cathedral allows us to trace the story. The building of Wells Cathedral was the work of sets of masons who began in the twelfth century, and carried on, with certain breaks no doubt, but still with what was practically a continuous succession of stone-cutting craft, culminating in the statues of the west front, and leading on in them from step to step of progress until the highest attainment was reached. The material was the oolite stone called Doulling, which is quarried near Shepton Mallet, about five miles away. This stone was used throughout for the whole fabric—for wall-stone and piers, for the shafts and mouldings, as well as for all carvings and statue work. The exception is in the latest building (1220-1240) in the shafts of the west front, which in the fashion of Purbeck shafts are not from the Purbeck quarries, but are worked in the lias limestone of Langport.

Now this combination of a coarse



FIG. 3.—"BISHOP."



FIG. 4.—"KING."

oolite in wall and arch with slender limestone shafts makes a distinct and peculiar sub-species of thirteenth-century masoncraft, which it is interesting to distinguish from the masoncraft in the finer Caen stone and Purbeck marble. This latter was what appeared at Canterbury first on a big scale in the work of William the Englishman, and then at Chichester, Rochester, Ely, Worcester, &c., and especially at Salisbury, contemporary with Wells but of a different craft. The Somerset sub-species, if we may call it so, since its oolite and limestone are the product of Somerset, is distinguished by certain peculiarities of moulding in arch moulds and capitals, and by not having its wall-stone dressed with the notched chisel. It occurs at Sherborne, Gloucester, and Exeter, but its great accomplishment was the

west front of Wells, and it was in connection with this craft that the great statue making of the front was achieved.

We can indeed trace back the thirteenth-century figurework to early beginnings in the West. Elsewhere in trying to give distinctness to the classes of First Gothic style in England, I have particularly ticketed the twelfth-century Gothic of the west of England as having peculiar advanced features founded on the local Romanesque, and taking the Gothic idea very far forward in comparison with the contemporary eastern Transition, and as, in my opinion, very distinctly laying the foundations of English Gothic. The sculpture of



FIG. 5.—"PRINCE" AND "NOTABLE"



FIG. 6.—"ORATOR"

this early Gothic school was a very remarkable part of it—its leaf-carving can distinguish it from contemporary schools, and its use of figure-work is equally distinctive. There are to be found in this district, and, apparently, dating to the middle of the twelfth century, a whole body of figure representations in the tympanum and in figure reliefs, of an advanced Romanesque type. The Wenlock lavatory and the Southrop font may be specially mentioned, and in the Malmesbury and Glastonbury doorways this figure-work of the late twelfth century, though remaining to us on a small scale, shows a decided Gothic freedom. The same school of carving may then be taken up at Wells in the figure-worked capitals and the head and dragon carvings of the North porch, and in the capitals, which have figure-motives of increasing skill and liveliness, in the transept and nave, and mixed with which are head-carvings of label, stops, and corbels, wherein the power of representation advances from archaism to a free and tender treatment of human expression.

Now side by side with this progress of the smaller architectural figure-works of the mason

can be seen at Wells another advance towards free sculpture. About 1200 the memorials to prominent ecclesiastics were taking the form of carved representations of their figures. In the south and east of England these recumbent effigies of bishops and abbots were supplied from the Isle of Purbeck in Dorset. But Wells Cathedral has no Purbeck effigies of the twelfth and thirteenth centuries. Instead are seven "bishops" carved in the Douling stone. Five of these can be dated to about the last years of the twelfth century, since the foliage carved round the effigy is of that peculiar type which at Wells, Llandaff, &c., makes the distinction of the western Transitional style. There is great variety of treatment in these five effigies, but they are all of the same manner,



FIG. 7.—"SEATED KING."

and may very likely have been carved all of a batch, on the principle of commemorating in Bishop Reginald's newly finished quire that building bishop himself and the four preceding prelates who since the Conquest had held the See of Wells. But specially the treatment of the attitudes and draperies is to be noted. Little by little these figures can be seen to obtain relief from the ground, and assume a statue-like form. Moreover, we can see that the sculptors who had started from the traditional goldsmith's technique—from the flat modelling and reeded lines, which in seal modelling, in lead font castings, and in the stone relief carvings of the tympanum, showed the style of Byzantine shrine-work and goldsmith's imagery—that the stone-sculptors in the use of the chisel upon a block of stone have acquired, with new ambitions, a new technique. In the draperies we can see the change is immediate—instead of the blunt edgings and shallow incisions, which in the goldsmith's hands are the indications of folds in dress, the habit of the mason's chisel makes deeply cut mouldings, in



FIG. 8.—"LONG LADY" ON SECOND TIER.

fact, the hollows and ovolos of Gothic arches. Now the setting of the fillet or angular edge upon the bowtell was not at first a characteristic of the West-country Transitional or Early Gothic style—but it comes in with the general diffusion of the characteristic Early English manner that came about the year 1200. It is interesting to observe, therefore, how closely the draperies of the figure-worker follow in the sequences of the arch-mould carver. We

can in the course of the Wells figure-subjects trace the parallel rounded ridges or bowtells (which at first represented the folds of the dress) acquiring angular projections, just at the date that the arch mouldings do, and soon in the working of flat fillets with hollowed intervals the Wells drapery reaches its characteristic representation. The recumbent effigies show the same steps—the two later in the north aisle of the quire have this drapery in its full style, and cannot be distinguished from the bishop statues of the front—they have only to be set upright to take their place with them [see *headpiece*].

Thus the art of the *free statue* in stone grew up without any special effort in the Wells building—every stage of its development can be noted in the architectural masoncraft. The head expression had been long in practice for label and corbel; the full relief and the attitude of a statue had by 1220 been for some time in the ambitions of the carver of recumbent effigies, by 1220 the draperies had made their expression in the architectural and effigy carving of the mason. Nor was the motive of this great enterprise of statue-making—that of setting up ranges of life-size saints—any sudden or new idea of the English art at the time. It is too often forgotten that life-size free-standing images had all along—from the tenth century, at any rate—been in the habit of English art. There is really no necessity to quote from the many early records which mention metal and wood images for roods and altar beams. The manner of such representation was part of the ordinary church fitting of the time, and every church had its niches and arrays of saintly figures. Though we have of course lost our English examples, they remain in many foreign churches, and that English churches were as full of native-made statues cannot be doubted. But this statue-making was goldsmith's work—adapted for the niches of an internal screen or reredos: the only new thing in the array of the Wells figures was that they were stonemason's work, and formed part of the architectural scheme of the open-air front. When the skill of the mason had reached that power of carving the human figure which, as we have seen, the building of Wells gave him, immediately the project of using his powers to furnish the great iconostasis of stone which the west front of Wells is, would arise and would be in the natural functional development of English Gothic style.

After this introduction let us now turn to the statues themselves. It is the continuous progress of the Wells statue-making which I propose to bring before you—showing, to my mind, that it was the work of a body of Wells masons engaged upon the building of the front, and not that of a foreign set of sculptors introduced for the purpose of the job of figure-work. I have, therefore, put the statues into certain groups, which by their technique separate themselves into successive stages of development, and will ask you to follow me through these successions, and observe how continuous they are, and how there is consistent progress from first to last. The illustrations will put before you twelve classes, which may be dated in



FIG. 9.—BISHOP AND LADY OF SECOND TIER.

succession. Figures 3-14 will show this, and impress on you the evidence of a peculiar Wells technique which was a distinctly native possession, growing out of the Wells building and declaring itself as the production of no foreign hand. Then, in order to emphasise this, I refer you to a figure remaining at Winchester in which the Wells manner can be seen



FIG. 10.—"DOCTOR," "PANEL" FIGURE ON WEST FRONT.



FIG. 11.—"PANEL" FIGURE AT NORTH-WEST ANGLE.



FIG. 12.—"PANEL" FIGURE ON NORTH TOWER.

carried a stage further, and then, for comparison with this, statues which are, I think, contemporary or nearly contemporary, first from Westminster and then from Lanercost and Lincoln. The Wells treatment will, I believe, display itself as distinct beside the other English works. And yet in them all—at Wells, Westminster, and Lincoln—there will be seen a general flavour, a generic likeness, which seems to me to be evident under the distinctions of species in the three [see figs. 15, 16, and 17].

But to emphasise this I have to turn to contemporary work abroad, and my friend Mr. Gardner, who has photographed many of the foreign statues, has kindly consented to give you such a survey of this field as our limited time will allow. Despite similarities and often identities of the subject of statue-making—despite the likenesses of treatment as to the characters represented—despite the free trade in motives which were common to all ecclesiastical art—despite the close parallelism in the conditions of the sculptors, abroad as in England working up from Romanesque traditions in stone-cutting to the accomplishment of Gothic ideals—despite



FIG. 13.—"IMAGE" FIGURE.



FIG. 14.—"PRELATES" ON NORTH TOWER.

all these I will ask you to observe that the handling of the English work shows as distinct from that abroad; that there is a generic French manner displayed at Chartres, Amiens, and Rheims, which, just as our English generic manner had its own varieties, developed in the sculptural evolution of each of these three cathedrals a particular specific technique that can in each case distinguish them.

If I can accomplish this the conclusion to which I lead hardly requires statement—it is

that the Wells statues were a production of English art, that they were not, as much assertion has declared them, the work of any foreign sculptor—for such assertion not only rests on no foundation, but distinctly ignores the evidence that is available—the evidence of the works themselves when put beside those of other places. For as it can be clearly seen that neither



FIG. 15.—WESTMINSTER CHAPTER-HOUSE.



FIG. 16.—LINCOLN: SOUTH DOOR OF ANGEL CHOIR.

the sculptors of Westminster nor those of Lincoln carved figures like those of Wells, so equally must those of Chartres, Rheims, and Amiens be acquitted of having had a share in them.

Before Mr. Gardner discusses the foreign statues, there is a point to bring to your notice in the evolution of drapery as this was accomplished in the hands of the Wells stone-carvers:

The costume of the twelfth and thirteenth centuries consisted of a series of tunics worn one over the other, fastened at the neck and usually girdled, such tunics as modern life has preserved in our linen bed-gowns, in the clerical surplice, in the academical gown, and the labourer's smock frock. Both sexes and all ranks and conditions, lay and cleric, were attired in these tunics, but other garments were worn with them as a matter of state, or proof of condition, such as the long cloaks of kings and ladies, that were hung from the shoulder and fastened by a cord in the front; and the priestly chasuble, which was in effect a circular or extinguisher cape through which the head was thrust. These are the draperies which thirteenth-century figure-sculpture mostly represents.

Now it was a remarkable peculiarity of the Romanesque or twelfth-century figure-representations of North-West Europe that they exhibited the garments as of very thin, almost muslin, texture, and as forcedly, almost violently, showing the anatomy of the figure. This forced anatomy was, I believe, a pure matter of artistic convention—the goldsmith's convention—in descent from Carlovingian art, the last remainder of Byzantine tradition and Classic nudity. Our English share in this tradition can be seen in the remarkable figures that are in the south porch of Malmesbury in Wiltshire. They may be accepted, I think, as being of the second or third quarter of the twelfth century. The method of their sculptors is to show the folds of drapery by round-edged incisions in conventional parallel lines or distinct radiations.

Now beside these I place the earliest carvings of the Wells front, those on the constructional spandrels above the west door. It can be seen that the angels on each side of the Virgin and Child exhibit the tradition of Carlovingian representation, but with some delicacy [see fig. 1].



FIG. 17.—LANERCOST: ON WEST GABLE.

But in the figure of the Madonna herself there is more—there is an improved representation of drapery. Now this relief is a detached piece of stone set in the quatrefoil; yet as to date it can be seen that the foliage of the dwarf capitals which are part of the stone is just that of the Wells capitals of the beginning of the thirteenth century; so we conclude that the carving of this piece was in the hands of the stonemasons, just as the angels had been. However, in their hands the drapery of the figure is acquiring a distinct manner—narrow raised ridges take the place of the furrowed slits of the earlier representations. Parallel grooves and outlining ribbings were the goldsmiths' representations of drapery; the chisel of the stonemason has, in practice, struck out a way of its own.

I am inclined to give a further illustration of this development, so I turn to contemporary work at Worcester. In the spandrels of the wall arcades of the choir at Worcester there can be seen just this similar evolution of drapery—from Romanesque grooving to Gothic sculpture.

The likeness of the Worcester work to the Wells Madonna is distinct, as it is to the Bible subject pieces at Wells that we may date shortly after the Madonna. These are in the quatrefoils at the top of the ground story, and were no doubt put in hand along with the quatrefoils in which they are set. They were therefore carved about 1225, within a year or two of the time of the commencement of the front. It can be seen how like is the treatment at Worcester and Wells, and how quickly the attainment in both has been reached. These Bible reliefs are of great beauty, but when seen from below, only the decayed parts are mostly visible. Close at hand one can find in the sheltered parts a charming delicacy of execution.

Finally, showing further attainment is the larger relief of the Coronation of the Virgin, in which Byzantine reminiscence has entirely disappeared, and drapery is shown with the natural and functional lines. We may take it that as the dress of the thirteenth century is here represented, so was it worn, and that the men and women of the day appeared, when seated, as the sculptor has here carved Our Lord and the Virgin [see fig. 2].

Yet in spite of this naturalness, there must be in sculpture conventions or manners of representation, and here these manners indicate this piece as Wells sculpture, and not the sculpture of any other place. I may point out one peculiarity which, I think, marks this as English work. That is the representation of the tunic of the Virgin to the feet. The contemporary Continental presentations, as far as I have been able to trace examples of this scene, always show the cloak of the Virgin carried right over the knees. Mr. Gardner will presently show some foreign examples, and what I think will be also evident is this, that in this relief the conventions of the Wells stonemason are his own. We note his rendering of the smooth part of drapery by a succession of fillet edges, and of the deeper folds by, as it were, arch-mould sections, though on the small scale of these figures the latter is less evident than it will be on the large statues [see figs. 4 and 5].

So much for the drapery. There is, however, one more point to be noticed, that these reliefs of Wells are detached pieces of stone. They are not reliefs cut in the constructional wall-stone. Their figures are statues in embryo. However, I turn to another source for the pose of the standing figure—the statue itself. This can be traced from the recumbent or memorial effigy, and I have already referred to the Wells effigies.

Note.—Figs. 10 and 11 are from the photographs by Mr. Phillips, of Wells. The remaining figures are from Mr. Gardner's photographs.

Mr. ARTHUR GARDNER, in showing a series of lantern views of foreign statues contemporary with those discussed by Mr. Prior, made the following observations:—

Mr. Prior has asked me to say a few words about some foreign sculptures contemporary with those of Wells, in the hope that even a brief glance at some of these will emphasise the point that he has endeavoured to bring home to you, that the Wells style is a purely English and, what is more, a local style. I am afraid I am hardly competent to lecture to the present audience on so vast a subject as French sculpture, but last summer I was fortunate enough to be able to spend a day or two with my camera at Chartres, which is, perhaps, the greatest museum of twelfth and thirteenth century figure-sculpture in France; and I hope that, even if you can detect faults in my arguments, the photographs of the works themselves will prove the point that I wish to emphasise.

In dealing with the Chartres work we will first look at the earliest statues in the west porch, not for any light that they may throw upon the Wells statues, but because I think they will be useful for comparison with the later figures at Chartres, and because I think we shall find certain features in

these repeated in the later statues which denote a local style of carving in nearly all the work at Chartres. The drapery is rendered by a series of parallel ridges and grooves. These are arranged very close to one another to represent very fine drapery, and no pains have been spared to make the work as rich as possible. These draperies cannot have been studied from natural draperies, but represent a long-established convention, and appear to me to be stone renderings of the forms long familiar to the sculptors in ivories and manuscripts.

The rest of the sculptures of this great porch display rather more freedom, though the same characteristics are to be found in all of them. In all the large statues we have the same curiously long proportions, the same fine draperies—*drawn* on the stone rather than *modelled*—the same zigzag folds and careful treatment of details. Some of the smaller figures in the mouldings above the capitals display more freedom and less convention than the stately kings and queens below, but otherwise the style is the same.

The Christ from the central tympanum is one of the most sublime conceptions in mediæval art, and there is a haunting beauty in all this strange early work which leaves an impression on the mind more lasting even than that left by the far more developed later statues. The date of this porch is 1140 or 1150. The latter date—about 1150 or a year or two later—is that favoured by M. de Lasteyrie, the latest authority.

For work of the end of the twelfth century, between that of the west porch at Chartres and the thirteenth-century sculpture there, I have not been able to find a photograph to show to-night without going rather far afield. However, the great porch at Santiago de Compostella, in Spain, is of the right date—1180–1190—and can be studied from the east at South Kensington. Though we must allow for local peculiarities, this work is a good example of the period. We have lost the mystic charm of the Chartres figures, but we have perhaps a more vigorous art. Proportions are more natural, and there is much more attempt to render movement and expression. We still have the drapery represented by ridges and grooves, and the zigzag folds are very conspicuous.

We must now pass on to the north and south porches of Chartres, which we may take as more or less contemporary with the work at Wells. I have not been able to find the exact date of the work, but Viollet-le-Duc dates the north porch 1230–1240. According to some authorities the work was begun in 1215 or 1220, but it was not entirely finished till 1275. Most of the work must, however, have been carried out before this, and we have a record that in 1259 St. Louis "caused the north porch to be completed," and that the church was dedicated in his presence in the following year. The work done after this must probably have consisted in a few finishing touches to the south porch and possibly in the gallery of kings arranged above it.

Judging from the statues themselves the earliest appear to be those in the western bay of the north porch. Much has happened in the seventy or eighty years that have elapsed since the carving of the west porch, and great progress in the art of sculpture is to be seen. Proportions are far more correct, and far more skill and variety are to be seen in the draperies; but we still have the same fine stuffs rendered by a multitude of almost parallel folds.

Passing on to the statues in the central bay, we see a slight advance, but the main characteristics are the same. We have the same multitude of small folds, with none of them boldly or deeply cut. The minutest details are carefully rendered, as can be seen in the marking on the stone of the rich embroideries of the robes of the St. Peter. In the edges of the garments we find reminiscences of the zigzag folds, though half disguised by an attempt at a pleasing variety. The long oval face and high cheek-bones are characteristic of the Chartres work, and can be seen in the statues of the south porch as well, and even in many of the early figures of the west porch.

The statues known as those of "founders" and "benefactors" on the outside piers of the north porch seem to be the latest of those in this porch, and may date from about the middle of the thirteenth century. The folds are rather more widely spaced and varied, but are evidently the production of the same school as the other statues. The long faces, with long nose, high cheek-bones, and small pointed chin, are of a French type, and differ much from the broad type of the Wells faces.

The heads of the Deacon figures at Wells are good examples of English work. They are of a broad square type, with a large and heavy chin, giving a determined look, which contrasts strongly with the long oval face of the French type. The German thirteenth-century head is usually small, as

in the important statues at Naumburg, represented by casts at South Kensington. The features are generally small and screwed up into a broad smile. The work often is bold and strong, but lacks the calm beauty of the French ideal.

It is time now to turn back to the south porch of Chartres. The statues here are, as a whole, less interesting than those of the north porch, but there are some good ones among them. Both porches were being built at the same time, but the average date of the sculptures of the South may be somewhat later. Some of the figures are rather stiff and mannered, but most of them present the same features as the rest of the Chartres work. The fine draperies and careful rendering of embroideries and details are conspicuous. The well-known figure of St. George, however, is of a rather different type, and may be as late as 1250 or 1260. The bolder treatment of the drapery and the broader and more varied folds display the handiwork of a well-trained sculptor, and bring this statue into closer connection with other French sculpture of the period.

The gallery of kings above the south porch I have taken as the last work among the Chartres thirteenth-century sculptures. These may have been put up after 1260. They are placed high up, and are not very striking. The faces are of a regular French type, and the draperies are rather monotonous. We see somewhat similar work to this at Rouen and elsewhere.

Among the most important sculptures of the early years of the thirteenth century must have been those of the west front of Notre-Dame at Paris. Most of the larger statues, however, have suffered so much from mutilation and restoration that I do not feel on safe ground in taking them as evidence. I will, therefore, content myself with quoting a sentence from Viollet-le-Duc, who says, "It is easy to recognise at first sight a statue belonging to the school of the Ile de France in the thirteenth century among a thousand others," and pass on to the famous sculptures of the west front of Amiens Cathedral.

Most of this work appears to be of about the year 1230, and differs almost as much from the Chartres style as from that of Wells. The statues are large and simple in style, and few of them show the elaboration of detail which we find at Chartres. Draperies are not often very deeply cut, though they are effective and always up to a fairly high standard in quality; thus showing the existence here of a well-practised school of sculpture. Most figures are standing squarely on both feet, with the knee hardly bent.

A rather bolder style is to be seen in the famous statue of Christ which occupies the central position of the front. The draperies are more deeply cut and the whole shows an advance in style. Either it must be a few years later in date, or this important statue must have been entrusted to an artist who was somewhat ahead of those who were at work on the rest of the front.

For work of the middle of the century we must turn to Rheims. It is impossible to describe this vast array of sculpture in the few minutes at our disposal to-night, but I will try to pick out one or two characteristic features. Some of the statues of the north porch are rather coarse, and may be earlier, but many of those of the western porches are of supreme excellence. The sculpture here, as one would expect from its geographical position, lies half-way between that of the Ile de France and German schools. The draperies are bolder and more deeply cut than in the older work and the heads usually rather small. Faces are often smiling, but never lose the French prettiness. The eyes are long and narrow and placed horizontally, or even with the outer corners raised—a feature noticeable in the angels, and which may be due to German influence.

Some of the statues belong to a different class and are of a distinctly classic type; as, for example, the group of the Salutation. The folds of the drapery are small and much broken up, and the faces broad and noble, reminding us of the best Roman or Hellenistic portraits.

If we take a group of statues representing the same subject, such as the Salutation, from each of these great cathedrals and compare them carefully one with another, we can hardly fail to be struck by the fact that each group represents a local style with its own peculiarities and conventions. Above all, the Wells figures form a class by themselves; and after looking at a series of photographs of mediæval sculpture, both in this country and abroad, I think you will admit that Mr. Prior is justified in claiming the Wells sculptures as distinctly English work, with marked characteristics which distinguish them from the great French sculpture of the period.

DISCUSSION OF MR. PRIOR'S PAPER.

The President, Mr. ASTON WEBB, R.A., F.S.A., in the Chair.

MR. W. H. ST. JOHN HOPE, M.A., said he was so thoroughly in accord with all Mr. Prior had said that he had very little to say on his own account. As regards the English origin of these figures he was entirely in agreement with Mr. Prior. Only a few weeks ago he had the opportunity of showing to M. le Comte de Lasteyrie the photographs of these wonderful figures from Wells. He asked M. de Lasteyrie whether they had anything of the kind in France that would justify those who claimed a foreign origin for some of them, and he said at once, "No, there was no French influence in them—they were perfectly English," and with the verdict of so high an authority he thought they might rest content. It was rather exasperating, in taking up guide books and other so-called authorities, to find that all the fine work in this country was set down to foreigners. Yet when they made a comparative examination of one work with another, or when they went to those absolutely undeniable authorities, the documents, it would be found that so-called foreign works, or even works that looked as if they ought to be foreign, were almost always the work of men who bore English names, and whom there was no reason to suppose were other than Englishmen. Dining not long ago in the hall at Magdalen College, Oxford, he was seated in front of that beautiful panelling behind the high table. He asked one of the Fellows, who had made the study of the College a speciality, whether he had found any reference in the College accounts to the men who produced this very charming Renaissance work, and he replied that he had, and shortly afterwards he (Mr. Hope) received from him the references to the accounts. The timber had been sent from London to Oxford, it had been carved in Oxford by Englishmen, and the account showed that this wonderful Renaissance work was the work of English artists, and not of Italians, or even of Flemings who were tainted with Italian traditions. Mr. Prior and Mr. Gardner had shown how very clearly these Wells examples stood out from anything else as being the product of our own country and not of any other. He had been over these figures several times with Mr. Prior upon the scaffold, and with Mr. Lethaby too, and their views were so thoroughly in accord that he could add nothing to what Mr. Prior had said, and he should like to hear what other people had to say who had heard Mr. Prior's views.

PROFESSOR W. R. LETHABY expressed his entire general agreement with Mr. Prior; he did

not differ from him even in the minutest detail. With regard to the founders' statues at Chartres mentioned by Mr. Gardner, the most recent opinion was that all these statues represented saints and scriptural people. It had been shown, with regard to these so-called founders at Chartres, that the very ones that were called Countess Matilda, King Richard, and so on, had below them figures of David and Samuel and biblical people, and the most recent view was that they could all be assigned to biblical people and to saints in the calendar. Anybody in search of a holiday should go to Rheims this coming summer. A vast scaffolding was creeping round its west front, which stood out beyond anything else in Europe that it was possible to see—except, perhaps, from an entirely different point of view, St. Mark's in Venice. One-third of the front on the west side was already covered by a tremendous field of scaffolding, and that would be removed, and when it was removed nobody would know what they would see then!

PROFESSOR BERESFORD PITE [F.] said he had derived special pleasure from renewing an acquaintance made many years ago with the sculptures at Wells, and as it had not already been done, he should like to propose a vote of thanks to Mr. Prior, and also to Mr. Gardner, for the exceedingly interesting, valuable, and important and pleasurable Paper and illustrations they had had that evening. To architects there was a very great and delightful element of beauty in the Wells front. The extraordinary contrast of the forms of the sculpture, and yet their harmony with the columns and the shaftings, was of very great value as an element of design, and it was altogether charming to be told by Mr. Prior that the forms of the mouldings linked themselves with the sections of the drapery. There was something fascinating in that idea that he did not think they would readily forget. The design of these sculptured fronts was very interesting. One had been rather compelled to the thought that they were designed to provide niches for a story, that the architectural design was subordinated to the theory, or the poem, or the ecclesiastical intent of the front. He had always felt that very strongly at Wells, but he did not know that he was going away contented with Mr. Prior's interesting disquisitions on chisel markings, and Professor Lethaby's entire agreement in these minute details, if they had no indication of the story that had led to the creation of these delightful series. The biblical

series down below, the Resurrection series up above, were didactic in a high degree, and one could not but believe—or rather one would expect—that the figures in between had some story, meaning, order, and ratio, which would define to a great extent the limits of the original design. Unfortunately, Salisbury was not what it had been. In Peterborough, in Crowland, and in Lincoln, they saw other façades laid out for sculptural representation, and he could not accept the feeling that a mere architectural arrangement of niches was designed by one man, and then a group of sculptors was called in to fill them accidentally, in some cases with portraits, in others with scriptural figures. He had an idea that a great plan, such as that which underlay the subject-matter of a stained-glass window, underlay the subject-matter of this front. He hoped before they separated they would have a little daylight thrown on this very interesting and important subject. Of course there was still at Wells a feeling of great originality on the part of the designer. The man who designed that front cut himself free from a great many traditions, and thought for himself. As regards the form of the gable, he had no knowledge of any other of the kind in England. He did not know if it was altogether unique, but his knowledge on the subject was a little limited. It was certainly very remarkable and very peculiar, and exceptional in stone. He supposed it was always the intention to erect western towers, and that some idea or some design must have been in existence when the lower part of the front was planned, to harmonise and carry out the same treatment, or a treatment harmonising with the gable in those western towers. Much about the same period they had Peterborough, with its great originality of treatment, as well as the other façade fronts at Salisbury and Lincoln. Was not Hugh de Wells translated to Lincoln? Did he not do work at Lincoln very soon after the work at Wells? So there was some great movement in the direction of originality of treatment at work among their English church architects at that time that was a matter of great interest, and of which Wells was one of the finest examples.

MR. HUGH STANNUS, A.R.C.A. [*F.*], in seconding the vote of thanks, said that with regard to the suggestion of asking Mr. St. John Hope to explain the storiation: Mr. Prior had explained that the scheme of storiation was being carefully worked-out by two friends of his, and he trusted they might have an opportunity of reading about it later on. Two thoughts had struck him very strongly while looking at the delightful series of slides shown by Mr. Prior and Mr. Gardner. The one point was—how very like the development of Greek art they were: he could exactly parallel every stage of that development from photographs that he had, beginning with the

archaic statues dug up in the recent excavations on the Acropolis, right down to the group of the Three Graces, or whatever the subject might be, in the British Museum. There was firstly a striving to express the drapery by parallel lines; then the zigzag folds so strongly marked in the archaic Greek and other early work; then later on, where the folds became larger and with greater vitality in them, till they came to that noble work of Phidias—which, he ventured to say, with all respect to the Greeks, could fairly be paralleled by some of the work shown on the screen that evening. He remembered how, a great many years ago, at the Architectural Association, somebody made the remark that there was the same character in a transverse section of the folds of Greek drapery as in the transverse section of the Greek mouldings, and he was interested to hear Mr. Prior bring this out also with regard to Gothic drapery and Gothic mouldings. That was another proof, if one were needed, that all great art is one, and that the sculpture was not imported from the Continent, and put there, but that it was really made in England, like all great art—for its place, and probably, in some instances, in its place. The other thought that occurred to him was a criticism on the general design of Wells. He felt there was a great want of repose in that front. In this respect it was similar to the Certosa, near Pavia. In this latter building: the front was very much broken-up by boldly projecting buttresses, and the constructive value and expression of these buttresses were utterly destroyed by the treatment with niches, just as one felt in the Wells front. He would be glad to be able to fill-up, with plaster if need be, those niches in the Certosa; and he thought the design at Wells would have been a stronger one if the scheme of decoration of the whole front had not been carried right across. Between the vertical effect of the buttress and the horizontal treatment in the bands of niches and statues, there was, one might say, a want of unity; and it was not so pleasing as if one system had been predominant. He would also desire to note the admirable introduction that evening of the double lantern, so that two slides could be shown side by side simultaneously; and thus the full value of the contrast in the development, to which Mr. Prior and Mr. Gardner had alluded in their lucid explanations, could be appreciated.

MR. CONRAD DRESSLER said Mr. Prior had given him to understand that his Paper was a lecture on archaeology, but he was going away convinced that it was a lecture on most beautiful art. He had of late years very much admired Gothic art, though he was trained in Classic art, but he had never seen so many examples of the former placed upon the screen, as he had that evening, side by side, and had not had an oppor-

tunity of comparing the merits of these various schools of Gothic art. He, too, had observed, before Mr. Stannus spoke of it, the great similarity there was in the growth of Gothic art and Classic art. He quite agreed that there was a natural development which seemed to belong to every school, and the first effort of all sculptors had been to imitate architectural forms—straight long forms like columns, long figures with small heads with lines down them very much like the flutings of the Corinthian columns—and by degrees it was the effort of the artist to bring life into them, to bring arms farther away from the body, with more and more of attitude and more and more of action. He felt quite certain that the time came when this emancipation of the statue became injurious to the building, and that was the stage they had reached at the present moment. That, he was afraid, was really one of the reasons why their sculpture did not ally itself to their architecture. The sculpture at the present moment was rather too free. His chief interest, however, in all these things was that of the modern man. Archaeology was very interesting, but the great thing was, how were they to derive any benefit, or how were their times to get any of the beauty of the past back again? He did not propose to attempt any solution of that question, but there were doubtless many present who could give some hints, and it was very desirable that such hints should be given. He was sure every one would be delighted to have opportunities such as the old sculptors had of expressing themselves upon the face of fine buildings, rather than of producing a quantity of pretty or even fine work which could only be placed in interiors or haphazardly in public squares, for which they were probably never intended; and he was sure they all would desire to associate themselves once more with the fine buildings of the times.

THE PRESIDENT said he was quite sure they were very unanimous in desiring to offer their best thanks to Mr. Prior for his Paper, and also to Mr. Arthur Gardner. To prepare such a Paper, and to get together and arrange the illustrations so as to make everything clear and easy to understand, must have cost considerable time and thought, and they were under a great debt of obligation to him. He believed they all agreed with him in thinking, though they had not had the opportunity of studying these figures as he had done, that they were the work of English sculptors. He understood from

Mr. Prior that probably these sculptors were really superior masons—men who worked on the fronts of the building, and by degrees, as they increased in skill, they were entrusted with the figure work of the building; they had grown up with the building, knew every portion of it, and became so ingrained with its architecture that the folds of the drapery and the sections of their figures were almost unconsciously affected by the mouldings by which the figures were surrounded. Looking at those illustrations, one could not fail to observe how well the figures blended with the architecture. He was quite sure that architects would be only too glad to find sculptors who would blend their work with theirs in the same way. How that was to be achieved in the present day he did not know. Sculptors worked in their studios and architects worked out of doors, and when the sculptors' figures were placed on the buildings they did not always accord so fully with each other as the combined work did at Wells. That arose through the different conditions under which their work was now carried out. It was, he supposed, impossible to expect sculptors to work on the building and by degrees to carve the figures. It was a point that affected sculptors as much as it did architects, and it affected architects as much as sculptors. Architects had all a desire to employ sculpture in their buildings, but there was that difficulty of assimilating it without the intimate knowledge which the sculptor should have of the building before carving the figure in the niche. The President concluded by asking the meeting to pass a most cordial vote of thanks to Mr. Prior, and also to Mr. Gardner.

MR. PRIOR, in responding, said he was very thankful to be able to agree with so much that Mr. Stannus had said, and particularly when he pointed out that it was perhaps rather a large order when Professor Pite asked them to go into the question of the meaning of the Wells front and all the real religious intention of that great building. He had only spoken an hour and a quarter, but it would take ten lectures to go into the whole subject. Neither was he going to be led by Mr. Conrad Dressler into the very burning question of how they were to get any tolerable sculpture upon their modern buildings. How was the sculptor trained in the Academy to appear upon their buildings as the Wells sculptor had done? He could only say that it would happen when the Academy was abolished!



9, CONDUIT STREET, LONDON, W., 23rd April 1904.

CHRONICLE.

The Registration Question and the Council.

At the General Meeting of the 18th inst., before calling on Mr. Prior to read his Paper, the President said he had one or two remarks to make with reference to a matter which closely concerned the affairs of the Institute. It would be known possibly that an independent committee consisting of certain members of the Institute had issued a circular asking the opinion of members on the subject of statutory registration. It was only right to mention that the Registration Committee which had been appointed in accordance with a resolution of the Institute had met, and this Committee had practically unanimously expressed the opinion that it would be improper to pre-judge the question by issuing such a circular to members before the Committee had had time to report. This opinion was not formally communicated to the committee, as had been intended, but there were several members of the committee present at the Council, and the Council had reason to know that the resolution was informally conveyed to them. He regretted to say, however, that, in spite of this strong expression of opinion, an appeal had been issued to members asking them to record their opinion on the matter before the Institute Committee had had time to consider the question, and therefore before they were in a position to lay before the general body the *pros* and *cons* of registration, which they were anxious to consider carefully with a view to reporting as to its merits or demerits. He had been informed by the Chairman of the independent committee that the circular in question had been sent out through some misunderstanding among the members of his committee. The Council felt, however, that in a matter of such importance there should have been no carelessness in taking such a step. [Hear, hear.] Three members of that committee, Mr. Seth Smith, Mr. Edmund Wimperis, and Mr. Guy Dawber, had, he understood, since resigned from the committee, and he (the President) hoped that other members would show their sense of this unfortunate occurrence by resigning also. [Hear, hear.] The action so regretably

taken had made the consideration of the question most difficult. The Council had thought it only right that he should make this statement to the general body at the first opportunity. While speaking on the question he might perhaps be allowed to give one little hint on his own account—viz. on the important question of the election of members of Council for the coming year, the responsibility rested with them to elect the best men to represent the Institute and the profession; he trusted members would consider not only this question of registration, but also the general qualification of each man to best represent them on the Council. [Hear, hear.]

War Office Barracks Construction Department.

Applications for appointment to the posts of Director of Barrack Construction and Deputy Director of Barrack Construction at the War Office should be forwarded to the Secretary of the War Office before April 30th.

The salary of the Director of Barrack Construction will be £1,500 a year, and that of Deputy Director of Barrack Construction will be £1,200 a year, and both the above appointments will be subject to the ordinary rules of the Civil Service as regards superannuation, pension, &c.

Candidates must be fully qualified architects with thorough knowledge of building.

Applications should be made by letter, stating age and giving full particulars of experience and qualifications, with names and addresses of references as to ability and character, and accompanied by copies (not originals) of not more than three testimonials.

War Office, April 15th 1904.

Re the late John Gibson.

National Provincial Bank of England, Limited,
112, Bishopsgate Street, E.C., 13th April 1904.

To the Editor of the JOURNAL OF THE ROYAL
INSTITUTE OF BRITISH ARCHITECTS.

DEAR SIR,—I am asked to request you to note the following in reference to works of the late John Gibson.

It is quite true, as stated in the note in the last number of the JOURNAL, that he designed the first Piccadilly Branch for this Bank. That is now, however, Slater's Restaurant.

The present Bank in Piccadilly, at the corner of Eagle Place, was designed by Messrs. Waterhouse and Son.—Yours faithfully,

C. H. BRODIE, Surveyor.

Exhibition of Civic and Social Art.

The Carnegie Dunfermline Trustees propose to hold early in May a Loan Exhibition of photographs, drawings, plans, &c., of cottage or tenement houses, village halls, schools, clubs, libraries, and other public buildings, street architecture, gardens and parks and their furniture;

and of civic improvements generally, especially such as are suitable for adoption in villages and smaller towns. The special object in view is to promote interest in housing reform and in the improvement of civic and social art generally, and to show what has been done in other parts of the kingdom and abroad. The Trustees intimate that they will gratefully welcome the co-operation of members of the Royal Institute in this undertaking, and ask for the loan of photographs, drawings, models, or other objects illustrative of the subjects mentioned. All expenses of carriage will be borne by the Trust, and every care will be taken to ensure the safety of the objects lent. Communications should be made to the Secretary of the Trust, Mr. J. H. Whitehouse, St. Margaret's Hall, Dunfermline.

THE SIXTH INTERNATIONAL CONGRESS OF ARCHITECTS, 1904, MADRID.

Report of the Secretary of the Institute.

To the President and Council.

GENTLEMEN,—I have the honour to report that, in accordance with your appointment, Mr. T. E. Collcutt, *Vice-President*, and myself attended the Sixth International Congress of Architects held at Madrid during the early part of the present month as official delegates of the Royal Institute of British Architects. Mr. Cutler, your other delegate, was unfortunately unable through illness to attend. The other British members of the Congress were Mr. Wm. Henman [F.], Mr. R. Clarke Edwards [F.], Mr. Wm. Scott (Ennis-killen), and Mr. J. Thomson (Tangier).

The official date fixed for the beginning of the proceedings was Wednesday the 6th April, but owing to a change in the engagements of His Majesty the King of Spain the delegates of the various countries were requested by telegram to warn their colleagues that the proceedings would begin on Monday the 4th inst. Mr. Henman, Mr. Scott, and myself arrived accordingly in Madrid on Sunday afternoon.

Monday, 4th April.—In the morning I reported myself at the Atheneo, the large literary and artistic club of Madrid, whose convenient offices and beautifully appointed lecture-hall had been given over to the Congress as headquarters. There I obtained the Congress button, a piece of Toledo inlay, tickets for the two excursions and the farewell banquet, and a card of invitation to the King's reception.

The reception took place at the Palace at 8 o'clock. Members of the Congress, with the ladies that accompanied them, were distributed according to nationalities in a suite of rooms leading from the Throne-room to the State Dining-room. The English, American, and Dutch were placed in three groups in one apartment. In due

course His Majesty Alfonso XIII. appeared accompanied by the President and Secretary of the Congress and the officers of his Court. The foreign delegates were honoured by presentation to the King, who shook hands and entered into a short conversation with each individually. I had the honour of being addressed by His Majesty in English. After the King had passed out, Her Majesty the Queen-Mother, the Infanta Isabella, the Infanta Maria Theresa (the King's sister) and her husband, the Prince of the Asturias, entered, and each in turn graciously conversed with the delegates and other members on presentation. All the members of the royal family spoke in English to the British and American representatives. After the proceedings were over the company were invited to wander about the State apartments and inspect the art treasures with which they were filled.

Tuesday, 5th.—The morning was devoted to the opening by Their Majesties of an exhibition of the monumental art of Spain. This was held in a pavilion with glass and iron roof, which formed part of the buildings of a previous exhibition, picturesquely situated in the middle of the Retiro, the public park of Madrid. Their Majesties and the other members of the royal family were received by Señor Don Ricardo Velázquez Bosco, President of the Congress, and the other members of the Spanish Executive Committee, and, after the presentation of such foreign delegates as had not arrived at Madrid in time for the reception of the previous day, were conducted round the exhibition. Before the royal personages left they conversed with various members of the Congress who had been presented.

The exhibition itself consisted of a magnificent series of photographs, which gave, as one went round the walls, an almost complete history of Spanish architecture; many original drawings of old buildings, notably the designs of the Italian Saqueti for the royal palace in 1742; various models, including one of the Segovia aqueduct; and casts of ornament, chiefly Moorish.

Wednesday, 6th.—The Congress proper began in the morning with the preparatory sitting. After the preliminary speeches the Bureau or managing committee of the Congress was constituted as follows:

President.

Señor Velázquez Bosco.

Vice-Presidents.

Señores Urioste, Repullés, Arbós, Landecho, Palacio.

General Secretary.

Señor Cabello y Lapidra.

Hon. Vice-Presidents.

Germany: M. Muthesius and M. Stübben.
Austria: M. Herman Helmer.

Belgium: M. Franz de Vestel.
 United States: MM. Allen, Russell, Taylor,
 Totten, Ittner.
 France: M. Daumet.
 Holland: M. Cuypers.
 Great Britain: M. Colcutt.
 Italy: M. Koch.
 Portugal: M. d'Avila.
 Russia: M. le Comte de Suzor.
 Sweden: M. Möller.
 Mexico: M. Riva Mercado.

Hon. Secretaries.

Austria: M. Weber.
 United States: MM. W. Eames, Glenn Brown.
 France: M. Poupinel.
 Holland: M. Salm.
 Italy: M. Cannizzaro.
 Great Britain: M. Locke.
 Mexico: M. Mariscal.
 Portugal: M. Carvalho da Silva.
 Sweden: M. Wickman.
 Switzerland: M. Fulpus.

In the afternoon at 3 o'clock the formal opening of the Congress took place in the hall of the University, the Minister of Public Instruction presiding, and supported by the Minister of Public Works, the Civil Governor, the Mayor of Madrid, and members of the diplomatic body. About 2,000 persons were present. The proceedings were formal and oratorical. After a discourse by the President on Spanish architecture and its relation with that of other countries, terminating with a cordial welcome to the foreign members of the Congress, the representative of each nation briefly addressed the gathering, Mr. Colcutt speaking on behalf of Great Britain. The Minister of Public Instruction in the name of H.M. the King then declared the Congress open.

Thursday, 7th.—The sitting opened with the consideration of Subject I.:—"The so-called 'Modern Art' in contemporary Architecture."

M. de Vestel, President of the Société Centrale des Architectes de Belgique, read an interesting Paper in which he defended the freedom of Art, especially in architecture, which must be characterised by a personality and not fall into stereotyped grooves. He established the difference between "modern style" and "modern art" which follows all the vicissitudes or changes of Society.

M. Muthesius (Germany) read a Paper showing the influence of modern methods of scientific construction, and claiming that modern architecture could have rational development only through the close union between the architect and the engineer.

The subject being talked out, Subject II. was brought forward—"The Preservation and Restoration of Architectural Monuments."

A Paper by M. Cloquet (Belgium) was taken as

read, and various propositions laid down by him were discussed until the sitting terminated. At the afternoon sitting the discussion was resumed, and finally the following resolutions were adopted:

1. Monuments may be divided into two classes, *dead monuments*, i.e. those belonging to a past civilisation or serving obsolete purposes, and *living monuments*, i.e. those which continue to serve the purposes for which they were originally intended.

2. Dead monuments should be preserved only by such strengthening as is indispensable in order to prevent their falling into ruin; for the importance of such a monument consists in its historical and technical value, which disappears with the monument itself.

3. Living monuments ought to be *restored* so that they may continue to be of use, for in architecture utility is one of the bases of beauty.

4. Such restoration should be effected in the original style of the monument, so that it may preserve its unity, unity of style being also one of the bases of beauty in architecture, and primitive geometrical forms being perfectly reproducible. Portions executed in a different style from that of the whole should be respected, if this style has intrinsic merit and does not destroy the aesthetic balance of the monument.

5. The preservation and restoration of monuments should be entrusted only to architects "diplômés par le Gouvernement," or specially authorised and acting under the artistic, archaeological, and technical control of the State.

6. A society for the preservation of historical and artistic monuments should be established in every country. They might be grouped for common effort and collaborate in the compilation of a general inventory of national and local treasures.

Subject III. was then taken—"The Character and Scope of Scientific Studies in the General Teaching of Architecture."

A paper was read in Spanish by Señor Fernandez Casanova, and the meeting was adjourned till Saturday.

After the sitting, members were invited by the architect Don José Grases Riera to inspect the monument to King Alfonso XII., in course of erection in the Park of Madrid.

An illustration of the monument as it will be when completed is given opposite.

Friday, 8th.—The day was devoted to a visit to Toledo. The Civil Governor and the Mayor welcomed the Congressists at the railway station. Various Spanish architects attached themselves to small groups of foreign members and conducted them through the Cathedral and to the objects of interest in the town. Mr. Clarke Edwards and myself are particularly indebted to the great courtesy of Señor Acerbo y Retortillo, who placed all his intimate knowledge of Toledo at our service, and spared himself no pains to render

our visit delightful. Lunch was served in the little Teatro de Rojas, the floor being boarded up to a level with the stage. The band of the Military Academy played in the balcony, and the boxes and galleries were crowded with all ranks of Toledo society, a gay battle of flowers between Congressists and spectators taking place all through the meal. The bandmaster, after playing a *jota*—one of the Spanish national dances—received a floral ovation, and delightfully played the piece again. In its unexpectedness and spontaneity, this lunch was one of the most pleasurable and certainly the quaintest incident in the Congress.

to Subject IV.—“*The Influence of Modern Methods of Construction on Artistic Form.*”

M. Berlage (Amsterdam) read a Paper on armoured concrete, proclaiming it to be the determining cause in the evolution of future architecture, and urging architects to study artistic forms in their present use of it if they desire to remain masters of their art.

Señores Forte and Jalvo (Madrid) and M. Cuypers (Amsterdam) read papers, and the synopsis of a paper by M. Guastavino (New York) was placed before the meeting. The discussion lasted until late in the afternoon sitting. A paper, Subject V.,



MEMORIAL TO ALFONSO XII., LATE KING OF SPAIN, IN THE PARK OF MADRID. (IN COURSE OF CONSTRUCTION.)

Saturday, 9th.—At the morning sitting of the Congress the educational subject was resumed. Señor Mariscal (Mexico) and Señor Puig y Cadafach (Barcelona) read papers. The discussion eventually became a contest between the advocates of the scientific and those of the artistic or æsthetic training of the architect. M. Guadet, Professor at the École des Beaux-Arts of Paris, upheld the French atelier system by which the pupil becomes the real disciple of the master and develops by means of intimate personal contact the artistic sense, which is the beginning and end of the architect. Eventually it was resolved that the *bureau* of the Congress should formulate the conclusions that might be deduced from the various arguments.

The same decision was arrived at with regard

“*Artistic Copyright in Architectural Works,*” read by Señor Salvat (Barcelona), brought the proceedings to a close.

In the evening M. Cannizzaro (Rome) gave a lecture, illustrated by lantern slides, on the excavations executed under his care of the Church of S. Sabba, and on the *Ara Pacis Augustæ*.

I greatly regret that on the following day personal affairs summoned me imperatively back to London. Being by this time the only English representative at Madrid, I was in some embarrassment, which was relieved, however, by the timely arrival at my hotel of Mr. A. N. Prentice [F.], who, though not intending to join the Congress, very kindly undertook to stay in Madrid and take my place on the *bureau*. The subsequent notes

of the proceedings are from material which he has since been good enough to supply.

Monday, 11th.—The subject of architectural copyright was resumed. M. Cabello y Lapiedra's Paper having been laid on the table, M. Harmand, advocate at the Cour d'Appel, Paris, who has identified himself with the question in France, and succeeded in 1902 in obtaining the insertion of architectural works in French Copyright Law, moved the following resolutions, which were carried unanimously:—

"That seeing:—

"1. That architectural designs comprise exterior and interior perspectives, plans, sections, and elevations, and constitute the first manifestation of the thought of the architect and the work of the architect;

"2. That the building is only a reproduction on the ground of the architectural designs;

"works of architecture should be protected in all legislatures and in all international conventions in the same degree as other artistic works."

Subject VI. came on for discussion—"The Education of Builders' Workmen."

The following conclusions were arrived at:—

1. Governments, municipalities, and professional bodies should pay particular attention to the technical education of the workman.

2. The teaching should extend to all branches of building, and not be confined to specialities, more or less artistic, for the study of which schools already exist.

3. The teaching in these schools should have as practical a character as possible, so that the teaching should produce good workmen.

4. The direction of these schools should be entrusted *entirely* to architects, and the teaching carried out by technical specialists and experienced master workmen.

5. These schools should issue *certificates* of having passed through the course, and not *diplomas*, which might give rise to false interpretation.

6. Supplementary classes should be established so that workmen after having worked for at least three years as journeymen might by further studies acquire the title of foremen.

7. Architectural societies should encourage workmen by prizes, medals, and other rewards.

The meeting passed on to Subject VII.—"The Influence of Administrative Regulations on Contemporary Architecture."

The conclusions were left to be drawn up by the bureau.

Subject VIII.—"The Expropriation of Works of Architectural Art"—produced the following resolution:—

"The State has the right to expropriate any work of artistic or recognised historic value when in the hands of the owner it is being destroyed or not duly preserved, always provided that an

indemnity fixed by competent persons be paid to the owner."

Subject IX.—"Is it desirable that the Architect should intervene as Arbitrator in the relations between Patrons and Workmen and in the Disputes that arise between them?"

A resolution was passed answering the question in the affirmative.

A supplementary resolution, proposed by Señor Acebo (Madrid), not down on the agenda of the Congress, was then carried in these terms:—

"That foreign delegates and the Executive Committee of the Congress solicit from their respective Governments the mutual and gratuitous cession of reproductions of details or not very extensive complete works which, corresponding to different epochs of national art, may become the property of State museums, on the express condition that such reproductions shall be applied to the formation of architectural museums in towns in which architectural education is given either in special schools or officially authorised private ateliers."

Tuesday, 12th.—The day was devoted to an excursion to Alcalá and Guadalajara.

Wednesday, 13th.—At the meeting of the bureau the application contained in the letter dated 29th March from the Council of the R.I.B.A. was considered, and it was resolved that the next International Congress should take place in London. As four years had elapsed between the Fifth Congress in Paris and the Sixth Congress in Madrid, it was determined, in order to preserve the triennial character of the Congress, that the Seventh should take place two years hence, in 1906 and not in 1907, as the Council of the Royal Institute suggested. The formal communication from the bureau will no doubt arrive in due course.

In the evening the farewell banquet took place.

I cannot conclude without a reference to the enjoyability and great interest of the Congress. We were favoured by the weather of a splendid English June. The courtesy of our Spanish hosts will always be a pleasant memory in the minds of all the foreign representatives. It is impossible to conceive a more perfect organisation. Information was lavishly supplied; in every fixture the strictest punctuality was observed; one had only to follow printed announcements and the way of every member of the Congress was smooth. Too much praise cannot be given to the Executive Committee; and the thanks of the foreign members are particularly due to the President, Señor Don Velázquez Bosco, and the Secretary, Señor Don Cabello y Lapiedra, whose labours in assuring the success of the Congress were indefatigable.

I am, Gentlemen,

Your obedient servant,

W. J. LOCKE, Secretary.

ELECTRIC GENERATING STATIONS.*

By E. KILBURN SCOTT, A.M.I.C.E., M.I.E.E.

A MARKED feature of most Continental power stations is the switchboard and its tower, which is generally built midway along the outer engine-house wall. The front panels of the switchboard are flush with the inside of the engine-house wall, and the whole of the engine-room space is thus available for machinery. All the switch apparatus proper is in the well-lighted switch-room behind, and the high-tension switches, of the flare type, are overhead, out of reach, and the high-tension conductors lead away from the tower immediately above. Not only does this make an exceedingly good arrangement from the engineering point of view, but it gives the architect an excellent opportunity to relieve what would otherwise be a blank wall. In a water-power station which the writer has had to do with, and which is now being built, this switchboard and tower will be the most prominent architectural feature. The offices, &c., are in a separate building.

Mr. Stanley Peach, in his Paper read before the Institute,* says that no materials capable of bursting into flame should be used, but unfortunately this is not the whole story, for rubber mats, linoleum, and insulating materials generally are very dangerous by reason of the dense smoke they give off. Wood should, of course, be barred, and yet at the same time some form of insulation must be provided on the switchboard platform, and in some cases round the machines. Glass reflector flooring for the switchboard platform provides such insulation, and at the same time has the advantage of allowing light to get underneath. Slate slabs may also be used with advantage.

Fire Risk.—A fault of many English stations is the crowding of the various offices, &c., round about the switchboard and engine-room. (See the drawings of the St. Luke's, Clerkenwell, and the Ipswich stations.*) Such offices must of necessity contain much inflammable material, stationery, furniture, &c.; and although the fire may not spread to the station, yet the water employed in putting it out is capable of doing much harm to electrical plant. It seems to me therefore that it is much better to let the boiler and engine-room and switch-room stand entirely by themselves.

If necessary a gangway fitted with fireproof doors can lead from the upper floor of the adjacent office building to the gallery round the engine room.

Battery Room.—I notice that in the case of Ipswich, described in Mr. Peach's Paper,* the battery room is immediately behind the switchboard. Before the introduction of the reversible

booster this would have been considered fair practice, because it would have shortened the numerous end-cell connections. With a reversible booster, however, only two or three connections are required, so the battery may as well be placed in some other convenient and less dangerous situation. Owing to the acid a battery room usually contains much woodwork, such as stands, &c., and the acid fumes are also liable to attack the switchboard fittings. The battery rooms at the St. Helen's and the Mersey Tunnel central station have been wisely built quite separate from the main station.

Chimneys.—Surely Mr. Peach's adoption of square chimneys for the St. John's Wood Station is a mistake, for, other things being equal, to get the same stability a square chimney must be much heavier, some say twice the weight, than a round one. A round chimney can be made to look well, as witness the magnificent stack of the Dresden electricity works, which, I think, is much finer than the one at Munich. Regarding sectional construction of the interior firebrick lining, this certainly strikes me as being a step in the right direction. Besides relieving the bottom layers of firebricks of the great stresses which would otherwise come upon them, it has the advantage that the weight of the lining is added to the stack, thus giving increased stability. It is especially helpful for steel chimneys.

Owing to the coming of the large gas engine and possibly the gas turbine, conditions will entirely change, and the chimney is not likely to be nearly so important a feature as it is in the present steam-driven stations. This being so, there is much to be said in favour of the quickly and cheaply erected steel stack. Such steel stack need not necessarily be an ugly structure; when made taper and fitted with a decent cap, as we have recently erected at Bath, it does not look at all bad. At any rate, the citizens and visitors in that somewhat æsthetic city have not complained.

Galloping Engines.—I note that reference is made by Mr. Peach to "galloping." The worst condition for this would appear to be when a number of single-crank horizontal engines have their cranks synchronised together, as at Frankfurt; yet I do not remember to have noticed or heard of any excessive vibration in that station. It is noticeable, however, that the engines are spaced well apart; indeed, this is characteristic of most Continental stations. In this connection it may be mentioned that the introduction of large slow-running gas engines is likely to give some little trouble from vibration. The division of the power over several cylinders is not a necessity, as it is when working with steam, and further it is not desirable from a manufacturing point of view.

I think it rather a pity Mr. Peach has not discussed such questions as ventilation, roof-lighting, provision for piping and cables, access between

* JOURNAL R.I.B.A., 2nd April.

various rooms and with the switchboard, coal storage arrangements, provision for getting in extension sets, &c. These are important matters which are apt to be overlooked, and the discussion of which would have been of great benefit. Exterior ornamentation is all very well, but the convenient interior arrangement and running of the station is the main thing.

REVIEWS.

EVOLUTION.

The Evolution of Earth Structure, with a Theory of Geomorphic Changes. By T. Mellard Reade, F.G.S., F.R.I.B.A., A.M.I.C.E., author of "The Origin of Mountain Ranges," &c. With 41 plates. 8s. Lond. 1903. Price 21s. net. [Longmans, Green & Co., Paternoster Row, E.C.]

Sir Oliver Lodge, in a recent address at the Birmingham University, stated that "in old days Heraclitus promulgated the doctrine that the universe was not a 'being' but a 'becoming,' that everything was in a state of flux, that nothing is stationary, fixed, or permanent. It is absolutely true. Twenty years ago it was thought that the atoms of matter were exempt from this liability to change. The form of grouping of the visible material aggregates changed indeed, but, as Maxwell said, the atoms themselves remain constant; they are the foundation-stones of the material universe, and are perfect in size and number and weight, unchanged and unchangeable, not capable of wear, but as true to-day as when they were coined at the mint of the mighty Artificer in some inconceivable dawn of creation. Not so; the process of change has now been found to reach to these also. Nothing material is permanent. Millions and billions—ay, trillions—of years it may last; but it is slowly changing, not merely the groupings, but the foundation-stones themselves. The atoms are crumbling and decaying. Must they not also be forming and coming to the birth? This last we do not know as yet. It is the next thing to be looked for. Decay only, without birth and culmination, cannot be the last word. The discovery may not come in our time, but science is rapidly growing, and it may. Science is still in its early infancy. We are beginning to comprehend a few of the secrets of Nature; we are yearly coming nearer to some sort of comprehension of the mind and method infused into the material cosmos. We now know things which have been hidden from the wise and prudent of all time. Surely somewhere there must be joy at seeing man thus entering into his heritage, and realising these primal truths concerning his material environment, whereof he has been living in ignorance all these thousands of years."

In this connection we are much interested to draw the attention of members to the work of an architect, Mr. T. Mellard Reade [F.], Past President of the Liverpool Geological Society, author of *The Origin of Mountain Ranges*, as also of *Chemical Denudation in Relation to Geological Time*, who has just published a treatise entitled *The Evolution of Earth Structure, with a Theory of Geomorphic Changes*.

In his preface, Mr. Reade remarks that "the application of dynamical principles to the explanation of the facts of geology is the most modern phase of geological investigation, and it is to this branch that my principal studies have been directed." His inquiry into the cause of regional oscillations of the level of the earth's surface, with the theory of geomorphic changes, is divided under three headings, viz.:—

1. Geological Evidences of Bendings and Changes of Level of the Earth's Crust.

2. Origin of Regional Vertical Movements of the Earth's Crust.

3. Magnitude of the Mechanical Forces involved in Continental Oscillations.

The subsequent portions of the book are devoted to the Dynamics of Mountain Structure and Experimental Geology.

He writes: "That there have been oscillations of the level of the land relative to the mean sea-level is a fact that attracted the attention of early philosophers and geologists. This was roughly inferred from the discovery of marine fossils in rocks thousands of feet above the sea-level. As the science of geology advanced, these marine exuviae, it was found, had been in one class of cases lifted into their positions by the folding of the rocks in which they were entombed, and their elevation into mountain-ranges by lateral pressure; and in another class of cases by the direct elevation—differential, it may have been—of whole regions to be measured by thousands of square miles. Again, it was found that in all but the more recent formations, such as the Pleistocene, the rocks had undergone so many vicissitudes and movements since they were laid down on the shores or beds of the sea that it was difficult, if not impossible, to tell whether the last movement had been one of elevation or depression. In fact, the only safe inference that could be drawn was that the vertical movements the earth's crust had undergone, as exhibited on the dry land, were multitudinous. The fossils, such as the nummulites found in limestone of Eocene age in the Alps, Pyrenees, Caucasus, and the Himalayas, and up to 16,500 feet in Western Tibet, had attained such extreme elevation through the rocks in which they were enclosed having been involved in the mountain-building. Later investigations have, however, shown that numerous vertical movements have taken place in the British Isles in what are called Pleistocene times, some being

pre-glacial, others glacial or post-glacial, or even recent. These are marked by raised beaches, buried river-channels, or submerged forests. The proofs of these movements are not to be questioned by any sane investigator. Let any one who doubts visit the 40-foot beach on which the town of Irvine, in Ayrshire, is built, and examine the constitution of this considerable raised plateau or delta as shown in the banks of the Irvine Water, where it cuts through these deposits, and I venture to predict that he will return convinced. Again, it has been conclusively shown by Spencer, Gilbert, and others that the region of the great lakes of North America has undergone warping or differential vertical movement, by which the originally horizontal shores of the lakes have become inclined, and it is considered by these geologists that the movement is still in progress. Gilbert estimates the mean rate of tilting at 0.42 foot per 100 miles per century. In Greenland, undoubted sea margins with marine shells of recent species occur up to 1,000 feet, and Colonel Feilden's observations go to prove that there has been a general movement of upheaval of the land which surrounds the North Pole, as previously pointed out by Sir Henry Howorth. In Africa, the valley of the Congo is continued seawards as a submarine valley to a profound depth, and I fully believe that a careful examination of any continent or island on the globe would yield evidences of fluctuations of level to a greater or lesser extent. Many thinkers, from an early period in the study of geology, seeing that while one portion of the earth's surface has been elevated another has been depressed, have considered the phenomena to be related as cause and effect, looking upon these opposite movements as contemporaneous; but why they should stand in this relation is not apparent. The explanation present to their minds appears to have been that in some unknown way there was a transference of material from areas of subsidence to areas of elevation, which, of course, must have taken place either in or under the earth's crust. An adequate cause of such a transference on the scale required is difficult to conceive. The additional mass of material added or pushed up in one area would have to be balanced by an additional weight added to the depressed area. A shifting of weight by denudation and sedimentation we can conceive; but, as we have seen, it is insufficient, and such transference, even if it bent down the crust, would not cause hollows or apparent depression, but rather filling-up. Where, then, can the extra weight in the depressed area be derived from to balance the extra mass in the upheaval area, for if one movement were consequent upon the other, some such transference of material would seem to be required? We can scarcely appeal to secular cooling of the earth as an efficient cause, nor am I aware that any geologists have done so. It may, however,

be thought that the cooling and falling in, or bending, of the crust can in some way produce this effect, but I have a difficulty in following out such a conception. Secular refrigeration, it appears to me, would act cumulatively in one direction, whereas the movements of the earth's envelope are essentially slow pulsations.

"On a full consideration it seems highly improbable that these movements are due in any great measure to either an external or internal transference of material from one area to another. The balance of pressure must be preserved within certain limits, and I find it impossible to think of any force or agency at work in the earth's interior tending to produce such a movement; but even if there were such an agency, its effects would be limited by the possible deformation the earth could stand and retain. I venture to think that if the specific gravity of the materials of the earth were identical in each of the zones from the surface to the centre, even though the earth were as rigid as steel, the present configuration or inequalities of the levels of the earth's surface could not be retained.

"If these conceptions have an element of truth in them, the mean specific gravity of the elevated parts of the earth, and the foundations on which they rest—that is, the continents and their mountains, and the under-mass of the earth—must be less than the specific gravity of the earth's crust and interior mass underlying the deepest depressions. So far as pendulum observations inform us, the fact appears to be established that the earth has a higher specific gravity under the oceans than it has under the continents. These observations, limited though they be, tend to show that though the levels of the earth's surface are variable, there exists in the earth's interior an equality of stresses, and that the protuberances do not create stresses on their foundations tending to force them down, and, by displacing the under-layers, bring about an equality of surface levels. If the protuberances—by which I mean those portions of the continents and islands that are above the mean spheroidal level—represent so much additional material piled upon a statically balanced spheroid, it seems to me that a gradual deformation must be taking place, and a sinking of the higher lands. Should this be the case, what force exists within the earth to prevent the continued effects of this weighting and the natural removal of prominences above the sea-level to one uniform plane? If no such force exists or has existed, the earth would long have ceased to possess the diversified features of land and water, so favourable to the habitation of man, and which have taken him so long to discover and map out. Whichever way the problem is looked at, it is evident that activities must exist within the earth tending to the preservation of the relative proportions of land and

water, which geologically seem to have been fairly constant throughout the ages.

"What, as philosophers, we have to find out is the probable nature of this active principle, which may, indeed, be reckoned as the vital force of our planet. That upheavals above the mean level of the spheroid are balanced by depressions below it, and that they take place contemporaneously, may or may not be true. We have no solid proof that it is so, and nothing in disproof. If true, it would at best be no more nor less than the statement of a fact, and carry no dynamical explanation with it. Looking at the question from every point, the various facts already stated appear to me to point to one conclusion, and to one only. The changes of level must be due to change of bulk of certain sections or portions of the earth without change of mass. To what can we assign this active principle of change? The most obvious answer is, variations of temperature. But what is there to create variations of temperature in the earth's mass? Blanketing by sedimentary deposits, as already explained, is quantitatively insufficient, and the movements are, as we have seen, largely independent of such surface transference of matter. Our acquaintance with the condition of the earth's interior is so limited that little more than suggestions can be offered. If the earth be the rigid body physicists now maintain it to be, it is obvious, considering the rate of increase of temperature downwards—the mean being estimated at 1° Fahr. per 50 feet—that it is only kept solid by compression, and that were a sufficient relief of pressure to take place at any locus the matter which before acted as a solid would then act as a fluid. The intermittent action of volcanoes and the changes of position in volcanic centres that have taken place in geological time seem to point to an instability of conditions such as would naturally characterise a globe at a high temperature kept solid by pressure. In my *Origin of Mountain Ranges* I have said: 'It seems to me that unless the matter which is molten at the surface is solid at its origin, it is impossible to formulate a satisfactory explanation of volcanic phenomena.' The view that our globe is an inert cooling mass, which suffers no change except that due to secular contraction, is not supported by the facts of geology. Indeed, the very reverse is the case. The materials of our planet, so far as we can observe them, are in a constant state of flux and change, sometimes very actively, at other times more slowly, and many are the changes rung on the combinations of the elements. These surface changes in the composition and form of the envelope of the earth are the life of the planet, and a continuation of, perhaps, greater changes which they have formerly undergone in the earth's interior.

"When we see that the outer envelope, with which we are best acquainted, undergoes an evolution through the continual addition made to

its sedimentary crust by the waste from rocks ejected at the surface by volcanic action, and by the chemical and mineralogical combinations and recombinations that take place from their new associations, can we refuse to believe that a mass of complex matter in the earth's interior, vast in comparison, at a very high temperature, and under enormous pressure varying with its depth, is not similarly, but to a higher degree, subject to change and interchange, combination and recombination?

"It is well known that the lavas ejected from volcanoes differ at various times. At one time basic lavas prevail, at another acidic. It has been sought, by Richthofen and others, to deduce laws which govern the succession of these eruptions, but, according to Judd, such attempts have hitherto failed. The fact, however, of the variability of the ejections points to mineral and chemical changes going on in nature's laboratory. When we consider that, even in minerals that crystallise out in two systems, the specific gravities are seldom the same, though the chemical constituents are identical, it would seem that such differentiation, whether proceeding from separation or recombination of the elements, would be accompanied by a change of bulk. Furthermore, when new combinations take place, they are usually accompanied by a change of temperature, which must affect the bulk of the matter in which it occurs as well as that surrounding and above it, through which the change of temperature must travel. Even in the process of cooling, sudden changes of temperature take place, as instanced in what is called 'recalcescence.' That the phenomenon of 'recalcescence' is accompanied not only by a sudden development of heat, but also by expansion and change of bulk, is shown by a process in certain American rolling-mills, where the bars are rolled in lengths of 300 feet, and allowed to cool in a special cooling bed, which keeps them straight. The great length of the bars renders very evident certain peculiarities in their contraction when cooling, the total movement being between three and four inches. It is noted that when first placed on the bed contraction proceeds rapidly, then checks, and finally ceases. The bar then expands again, probably during recalcescence, after which the contraction is uniform till the metal is cold."

The illustrations in Mr. Reade's book consist chiefly of photographs of metal and clay plates distorted by variations of temperature, by compression or strains, and explain the theory propounded as to the origin of the disturbance of the strata composing the crust of the earth's surface. The copious and well-ordered index affords ready access to the subjects dealt with.

In his closing remarks Mr. Reade writes: "Before I commenced the study of geology in the field, my practice as an architect and engineer had naturally brought me into contact with many

physical problems, and it is owing to this education that I am enabled to approach their solution from a standpoint somewhat different from that of most geologists. It is to the aid afforded by the collaboration of scientific workers in their various branches that we must now look for the advancement of one of the most interesting of studies—the history of the evolution and development of the structure of the earth we inhabit.”

FRANCIS HOOPER.

MINUTES. XII.

At the Twelfth General Meeting (Ordinary) of the Session 1904-5, held Monday, 18th April 1904, at 8 p.m.—Present: Mr. Aston Webb, R.A., F.S.A., *President*, in the Chair, 27 Fellows (including 10 members of the Council), 30 Associates (including 2 members of the Council), 2 Hon. Associates, and numerous visitors; the Minutes of the Meeting held 28th March 1904 [p. 324] were taken as read and signed as correct.

The President, on behalf of the Council, spoke deprecating the action of an independent committee of members in circularising the General Body with a view to ascertaining the numbers for and against statutory registration of architects, despite the known fact that the Committee appointed by the Institute to consider the principle of registration had deemed it inadvisable as a first step to take a poll of members on the question.

A Paper by Mr. Edward S. Prior, M.A. Cantab., on THE STATUES OF WELLS, WITH SOME CONTEMPORARY FOREIGN EXAMPLES, having been read by the author and illustrated by lantern views, a further series of illustrations was shown and described by Mr. Arthur Gardner, whereupon a discussion ensued and a vote of thanks was passed to Messrs. Prior and Gardner by acclamation.

The proceedings then closed, and the Meeting separated at 10 p.m.

ALLIED SOCIETIES.

THE GLASGOW INSTITUTE.

Annual Meeting.

The annual general meeting of the Glasgow Institute was held on the 6th April, Mr. Horatio K. Bromhead [F.], President, in the chair. The secretary read the thirty-sixth annual report, which stated that during the past session Sir James Guthrie, president of the Royal Scottish Academy, had been added to the roll of honorary members. The number of ordinary members on the roll is now seventy-three. The Council, the report stated, had received several letters from Allied Societies regarding registration of architects, but resolved not to do anything in the matter till the committee recently appointed by the R.I.B.A. had had an opportunity of reporting on the subject. A proposal to incorporate the Glasgow Architectural Association with the Institute is under deliberation. The President, in moving the adoption of the report, said that one of the most important improvements for the profession to which he looked forward was the openness and

publicity of competitions.* They were indebted to the Corporation of Glasgow, which had been most successful in obtaining by competitions a number of good designs for public libraries. This was a great contrast to the Royal Infirmary competition. On a recent occasion the Lord Provost said that the design which the governors were proposing to adopt had been submitted to their officials, who had indicated some details which it was thought required improvement; further, that the design had been, or was about to be, remitted to two experts, for them to suggest any possible improvements, provided the outside walls were not interfered with. They might therefore conclude that there might at last be a dawning idea at headquarters that a grievous mistake had been made in casting out the designs that were pronounced the best and in refusing to submit the inferior favoured one to public daylight. If he had not seen the front elevation of the chosen design it would have been his opinion that any new one might be better. But the proposed “sky-scraper” could only be considered, if placed adjacent, a calamity to the most venerable specimen of architecture in Scotland, the Cathedral. If it were for the public good, feelings might be stifled, but when it was known that the most modern and perfect ideas were dead against it, when one saw that the most remarkable modern hospital (Belfast) was only one storey high, and the intended new building at Birmingham was to be only two storeys high, one could not help seeing the ill-advisedness of spending a large sum of money after the manner of a bygone generation. However, the Institute might take a little comfort in the hope that their action had produced a limited modification of the defects. Looking ahead, there appeared to be a little cloud arising on their horizon in the unfortunate tendency to divide the profession into two parties. On the one hand there were architects who seemed to want to make out that art was everything, and who struggled to get elected into some art atmosphere which they possibly imagined was superior to architecture, where they could ignore business capacity and practical knowledge by employing skilled specialists to do the real work for them. Perhaps there was also a remnant who did not want to learn art, who even held that it could not be learnt, or certified, or valued, but could only be born in one. On the other hand, they saw men who were content to make their work practical and business-like, whose skill enabled them to use materials in a sensible and economical manner, but with little thought of suppressing what was ugly. From this point of view the recent agreement between the School of Art

* Mr. Bromhead acted as assessor in the competitions for the following Public Libraries, and except in one case all his selections were adopted by the Glasgow Corporation:—Springburn, Govanhill and Crosshill, Maryhill, Woodside, Dennistoun, Bridgeton, Parkhead, and Hutchesontown.

and the Technical College to confine the art teaching of architecture to the School of Art and the constructive and scientific branches of architecture to the Technical College was quite a disaster. The antidote was, however, in the air in the shape of a statutory registration of architects, which had become the question of the day. He hoped this question would lead both sides to see that the happy medium was a combination of both ideas.

The Office-bearers and Council for the ensuing year have been elected as follows:—President, Mr. John Keppie [F.]; Vice-President, Mr. James M. Munroe; Council, Messrs. David Barclay [F.], A. N. Paterson [A.], Horatio K. Bromhead [F.], James Lindsay [A.], T. L. Watson [F.], Alexander McGibbon [A.], Andrew Balfour, W. J. Boston, Professor Gourlay [A.], J. A. Campbell, Thomas Baird, junr., R. D. Sandilands, James K. Hunter, and J. M. Crawford.



PRESIDENTIAL BADGE OF OFFICE, LEEDS AND YORKSHIRE SOCIETY.

Designed by Walter Gilbert and executed in oxidised silver by the Bromsgrove Guild of Applied Arts.
Subscribed for by the Members of Council of the Leeds and Yorkshire Society during the third year of the presidency of Mr. Butler Wilson [F.].



REPORT OF THE COUNCIL FOR THE OFFICIAL YEAR 1903-1904.

Approved and adopted by the Annual General Meeting, Monday, 2nd May 1904.

SINCE the publication of the last Annual Report the Council have held 16 meetings, of which the Council elected in June last have held 13. The following Committees appointed by the Council have met and reported to the Council on the matters referred to them:—Competitions, Prizes and Studentships, Finance, Professional Questions, Education, Penrose Memorial, Past Presidents' Portraits, Holborn to Strand Sites, Professional Defence, Fellowship, London Building Act Amendment, Municipal Officials and Public Works, Registration.

The losses by death have been as follows:—*Fellows*: Herbert Ford, Charles Fowler,* William Warlow Gwyther, Walter Simpson McClelland, Edmund James Martin, William Pain, Percival Gordon Smith,* Henry Saxon Snell, Silvanus Trevail, Robert Walker, Nathaniel Young Armstrong Wales. *Associates*: Arthur Job Barlow, James Martin Brooks, Joseph William Twist. *Hon. Associates*: Henry William Brewer, William Henry Corfield, Alexander Stuart Murray, Edward Woods. *Hon. Corr. Members*: Achille Hermant, Valère Dumortier.

Royal Gold Medal. The Royal Gold Medal was awarded last year to Mr. Charles Follen McKim, of New York, who came to London to receive the Medal in person. The presentation was made on the 18th June, and the meeting was attended by His Excellency the American Ambassador.

It has been decided to award the Medal this year to M. Auguste Choisy [*Hon. Corr. M.*] of Paris, Inspector General in the Service des Ponts et Chaussées, in recognition of his distinguished merits as a writer on architecture. His Majesty the King has signified his approval of the nomination. M. Choisy will come to London to receive the Medal on the 20th June.

Membership. The following tabular statement shows the present subscribing membership of the Institute, compared with that at the corresponding periods of the last two years:

Year	Fellows	Associates	Hon. Associates	Total
1902	617	1,071	44	1,732
1903	627	1,117	43	1,787
1904	644	1,142	43	1,829

* Formerly Members of Council.

During the official year since the last Annual General Meeting 37 Fellows have been elected, 47 Associates, 6 Honorary Associates, and 5 Honorary Corresponding Members.

The General Body have approved of a Resolution of Council to take steps to alter the By-laws, so that, after the 31st December 1906, entrance to the Fellowship shall, except under special circumstances, be confined to Associates or those who have passed the examination qualifying for Associateship.

The Council also propose to the General Body an alteration of the By-laws with regard to the proviso to By-law 9.

The Progressive Examinations were held in June and November 1903. The Preliminary was held in London, Birmingham, Bristol, Cardiff, Glasgow, Leeds, Liverpool, Manchester, and Newcastle-on-Tyne; the Intermediate in London, Bristol, Glasgow, Leeds, and Manchester; and the Special Examination for Colonial candidates in Sydney. The Council desire to record their thanks for the valuable services rendered by the Hon. Secretaries and Examination Committees of the various Allied Societies. The Final and Special Examinations were held in London. The results are shown in the following tabulated form :

	Exempted	Examined	Passed	Relegated	Total
PRELIMINARY EXAMINATION . . .	94	275	204	71	369
INTERMEDIATE EXAMINATION . . .	5	223	103	120	228
FINAL AND SPECIAL EXAMINATIONS . . .	—	105	45	60	105

The total number of candidates was 702. The number of Probationers now stands at 2,085 and of Students at 524.

The Council have agreed to accept the Final Certificates in Architecture granted by the Manchester University, and by University College, London, as exempting from the Intermediate Examination, on the same conditions as govern the arrangement already made with the Liverpool University, notified in the Annual Report last year.

The Ashpitel Prize was awarded to Francis Winton Newman, who passed the Final Examination in November 1903.

The Special Examination for Colonial candidates will be held this year in Montreal and Melbourne.

It having been represented to the Council by the Institute of New South Wales that the holding of the Progressive Examinations in Sydney might be more advantageous than the one Special Examination, arrangements have been made for holding the Preliminary Examination in Sydney in June, and the Intermediate in November, of this year.

The Council desire to thank the Board of Examiners for the continuance of their invaluable services.

The Statutory Examinations, qualifying for Candidature as District Surveyor in London, and for Candidature as Building Surveyor under Local Authorities, were held in London in October. Certificates of competency to act as District Surveyors in London have been granted to Walter Godfrey Green, Ernest William Lees [A.], Arthur George Morrice [A.], Albert Perkins Stokes; and as Building Surveyor under Local Authorities to William David Jenkins.

The Deed of Award of the various Prizes and Studentships was presented to the Institute at a General Meeting on the 18th January. At the distribution of Prizes on the 1st February, after the Address to Students by the President, there was read a criticism by Mr. J. S. Gibson [F.] of the work submitted. An exhibition of the drawings was held from the 19th to the 30th January in the Gallery of the Alpine Club, and was visited by 1,400 persons. A selection from the Prize Drawings is now being sent the round of the Allied Societies,

Prizes and
Studentships.

Annual Dinner and Social Functions. The Annual Dinner of the Royal Institute took place on the 18th June 1903. This year the Annual Dinner will take place in Newcastle under the auspices of the Northern Architectural Association. A date—probably in October—will be fixed later.

Two "At Homes" have been held during the year by the President, and have been very largely attended. On the 11th May 1903, original drawings by the late W. Eden Nesfield were exhibited, through the kindness of Mr. E. P. May; and for the "At Home" on the 11th January 1904, Mr. Frank Pearson kindly lent a selection of the drawings of his father, the late J. L. Pearson, R.A. The thanks of the Institute are due to the President for his hospitality, and for the opportunity of social intercourse among members of the profession afforded by these admirable gatherings.

Form of Contract. During the official year an agreement between the Institute and the Institute of Builders and the National Federation of the Building Trades Employers of Great Britain and Ireland, with regard to a Form of Contract, has taken place, and the Form now issued bears the endorsement of the three bodies. It is the same, with very slight modifications, as that issued previously by the Institute.

Ancient Lights. The Ancient Lights Joint Committee have met during the official year, and the Bill, whose title has been changed to the "Easement of Light Bill," is again before Parliament this Session. The thanks of the Council are due to Mr. Fletcher Moulton, K.C., M.P. [H.A.], for introducing and furthering the interests of the Bill.

Building Regulations and By-laws. The London County Council having requested the Institute to submit Amendments to the London Building Act 1894, for consideration in drafting of a new Amendment Bill, the Council entrusted the task to the Art, Practice, and Science Committees, desiring each committee to suggest amendments to those portions of the Act which came within its special sphere of interest. The Reports of the three committees were then referred for collation to a special committee appointed by the Council. The Amendments as finally drafted by this Committee are now under the consideration of the London County Council.

The Council have drawn the attention of the Local Government Board to the desirability of uniformity in Building By-laws adopted by all the authorities surrounding the Metropolitan Boroughs, and of the Board withholding its sanction from proposed By-laws which would prove more onerous than those in the London Building Act.

The Council have sent to the Local Government Board, the London County Council, and the London Borough Councils a letter pointing out the unnecessarily drastic character of the new London County Council By-laws as to the deposition of plans with regard to drainage work, and urging simplification.

British Museum Extensions. The Council have been requested by H.M. Office of Works to assist the Government in obtaining a selection of the best architectural talent available by nominating a limited list of not less than six architects of taste, skill, and efficiency in classical design who would be, in their opinion, best qualified to carry out the important work of the proposed extensions to the British Museum.

Southwark Bridge. The Council have been in communication with the Corporation of London with regard to the association of an architect with their engineer in the erection of the new Southwark Bridge. The Bridge House Estates Committee have requested the President to advise them in obtaining competitive designs for the architectural treatment of the bridge on the structural lines already laid down by their engineer, as soon as the necessary Bill can pass through Parliament. Quite recently, however, difficulties have arisen which may cause considerable delay.

Registration
and
Education.

On Wednesday, the 24th June, the President met the Presidents of the Allied Societies in conference on various matters of professional interest. No resolution was moved, but the questions of registration, architectural education, and admission to the Fellowship were discussed, each President being called upon in turn to state his views. It was decided not to publish a report of the proceedings, their great value being the free interchange of opinions between the heads of the London and Provincial bodies.

On the 4th January the question of Registration was definitely brought before the notice of the Institute, at a General Business Meeting. Certain motions on the Agenda were withdrawn in favour of an amendment providing that the whole question of Registration should be referred to a Committee consisting of the Council and representatives of the Allied Societies. At their next Meeting the Council passed the following resolution:—"Seeing that the Council as at present constituted consist of twenty-four London members and fourteen non-Metropolitan members, the Registration Committee be formed by associating with the Council ten additional representatives of the Allied Societies, so that the number of the London and non-Metropolitan members of the Committee be the same; further, that these ten do consist of one representative from each of the eight Societies not at present represented by their Presidents on the Council, and of one additional representative from each of the two Societies which are numerically strongest in professional members, and which have not two or more of their members at present on the Council." Representatives having been appointed by the various Societies in accordance with this resolution, a preliminary meeting of the Committee was held on Monday 28th March.

The Council have appointed a Committee consisting of representative architects of the United Kingdom, both members and non-members of the Institute, and of such prominent educationalists as Sir Arthur Rücker, Professor Perry, and Mr. Sidney Webb, to devise a scheme for the co-ordination of architectural education throughout the country. The Committee and a Sub-Committee have met several times, and the Council have received and considered interim reports. As the Committee is still sitting, the Council beg leave to defer a fuller report to a future date.

Public Works
and Municipal
Officials.

The question of County and Municipal Authorities employing their own salaried officials to design and execute important public buildings has received the serious attention of the Council, who have appointed a Committee consisting of some of their London members and all the Presidents of Allied Societies to inquire into and suggest remedies for what they cannot but regard as a growing evil. The members of the Committee and various architects in the provinces have supplied the Committee with valuable information in writing as to facts bearing on the question which have come within their own experience, and various Honorary Foreign Correspondents and Architectural Societies abroad have also been kind enough to provide the Committee with interesting statements as to the position of affairs in their respective countries. The collation of the large mass of information received is now being proceeded with, and the Committee hope to submit their Report to the Council before the end of the Session.

Standardisa-
tion of
Materials &c.

The Council have approved the standard size of bricks, recommended by the Science Committee, after some years of negotiation and conferences with representatives of the Institution of Civil Engineers and the Brickmakers' Associations. A copy of the standard, to be known as "The R.I.B.A. Standard Size of Bricks," has been sent to all the brickmakers in the kingdom, and the Council have issued a request [see KALENDAR, p. 371] that members should insert the standard sizes in their specifications. The makers of glazed bricks have also had their attention drawn to the standard.

The Chairman of the Science Committee has been appointed by the Council to represent

the Institute on the Sub-Committee on Cement of the Engineering Standardisation Committee.

The Report of Brickwork Tests is now being printed, and will be issued in volume form as soon as it is ready.

The Council have appointed Messrs. Thomas Blashill, W. D. Carøe, and H. D. Searles-Wood to represent the Institute on a Committee of the Plumbers' Company, the Water Authorities, and the Royal Institute of British Architects, to inquire into the waste of water and the question of plumbers' fittings in water supply.

Liverpool University. Sir William Emerson, Past-President, on the recommendation of the Council, has been appointed a member of the Court of the Victoria University, Liverpool.

Congresses and Public Committees &c. Mr. John Slater [Vice-President] attended as the Institute representative at the International Congress of Hygiene and Demography, held in Brussels on 7th September last year.

The following have been appointed to represent the Institute at the Sanitary Institute Congress to be held at Glasgow in July:—Messrs. J. J. Burnet, A.R.S.A. [F.], E. T. Hall [F.], Thos. W. Cutler [F.], and Mr. John Keppie [F.], President of the Glasgow Institute of Architects.

Messrs. T. E. Colclutt [Vice-President], T. W. Cutler [F.], and the Secretary, were appointed by the Council as the Institute delegates to the Sixth International Congress of Architects, held at Madrid from the 6th to the 13th April.

Messrs. John Slater, J. W. Simpson, and the Secretary were appointed by the Council to represent the Institute on a Consultative Committee, authorised by the Board of Education, and assembled for the purpose of inquiry into the possibility of instituting a leaving examination from secondary schools, throughout the country, which might stand in lieu of the Preliminary Examinations required by the various professional bodies. The Committee has not yet issued its report.

Portraits, Memorials, &c. Mr. H. H. Statham [F.] has been appointed by the Council to represent the Institute on a Committee formed under the auspices of the Hellenic Society to effect the erection at Athens of a memorial to the late Mr. F. C. Penrose.

The Institute Memorial to Mr. Penrose has been placed in the Crypt of St. Paul's Cathedral, and will shortly be unveiled.

The Institute portrait of Sir William Emerson, Past President, by Mr. J. J. Shannon, A.R.A., will be exhibited this summer at the Royal Academy.

Competitions. The following have been the President's appointments to Assessorships during the official year:—

Aberysthwy	Council Offices and Free Library	Mr. Alfred Darbyshire.
Acton	County Schools	Mr. Leonard Stokes.
Alnwick	Infirmary	Mr. F. E. Caws.
Cardiff	Schools	Mr. W. D. Carøe.
Hitchin	Hospital	Mr. Keith D. Young.
Ilkley	Free Library and Public Offices	Mr. John W. Simpson.
Lambeth	Town Hall	Mr. Henry T. Hare.
Lincoln	Schools	Mr. John W. Simpson.
Malvern	Public Library	Mr. Henry T. Hare.
Manchester	Royal Infirmary	Mr. J. J. Burnet, A.R.S.A.
Southall	Schools	Mr. Paul Waterhouse.
Sunderland	Town Hall	Mr. J. Macvicar Anderson.
Sunderland	Victoria Hall	Mr. Henry T. Hare.
Torquay	Public Library	Mr. H. V. Lanchester.

Copies of the "Suggestions" have been sent to the promoters of the following competitions, together with letters requesting that a copy of the Conditions should be sent for the

Institute Library. In cases where the conditions have been unsatisfactory, letters urging modification have been sent to the promoters:—

Abergavenny: Free Library.
 Abersychan: Council Offices and Free Library.
 Acton: County Schools.
 Alnwick: Infirmary.
 Ayr: Infectious Diseases Hospital.
 Bangor: Houses for Working Classes.
 Barnet: Hospital.
 Berwick-on-Tweed: Widening of Bridge.
 Birmingham: Baths.
 Blackpool: Library and Baths.
 Borstal: Church.
 Bournemouth: Town Hall.
 Bray: Pavilion and Winter Garden.
 Brighton: Hospital.
 Bristol: Asylum for Imbeciles.
 Brooklands: Sunday School.
 Cardiff: Schools.
 City of London: Lying-in Hospital.
 Coedfranc: Public Library.
 Coventry: Hospital Extension.
 Elgin: Schools.
 Erdington: Council House and Free Library.
 Fraserburgh: Public Library.
 Frimley: Municipal Buildings.
 Glasgow: Public Library.
 Grimsby: Hydro.
 Haverfordwest: Meat Market.
 Herne Hill: Free Library.
 Heywood: Library.
 Horbury: Free Library.
 Hutchestown: Branch Library.
 Ilkley: Free Library.
 Ilkley: Public Offices.
 Kilmarnock: Workmen's Dwellings.
 King's Lynn: Infirmary.
 King's Norton: Library.
 Kirkintilloch: Town Hall.

Lewisham: Library.
 Leyland: Laying-out Estate.
 Limerick: Carnegie Library and Museum.
 Liverpool: Baths and Tramway Offices.
 Liverpool: Cotton Exchange.
 Llwynypia: Workmen's Hall.
 Loughborough: Public Library.
 Maidstone: Public Bridge.
 Malvern: Free Library.
 Manchester: Royal Infirmary.
 Newark: Grammar School.
 New Brighton: Club Pavilion.
 New Brompton: Board Schools.
 Newcastle: Grammar School.
 Norwich: Shire Hall.
 Oldham: Board School.
 Perth: Hospital.
 Poplar: Public Library.
 Rawtenstall: Free Library.
 St. Helens: Branch Library.
 Settle: Isolation Hospital.
 Skewean: Public Library.
 Stockton-on-Tees: Chancel for Church.
 Stonehaven: Town Hall.
 Sunderland: Town Hall.
 Sunderland: Victoria Hall.
 Swansea: Working Class Dwellings.
 Tamworth: Free Library.
 Taunton: Free Library.
 Thornton Heath: Children's Hospital.
 Twickenham: Free Library.
 Wakefield: Free Library.
 Wakefield: Cattle Market.
 Wallasey: Town Hall.
 Windsor: Police and Fire Station.
 Wrexham: Library Buildings.

Various changes in the "Suggestions" proposed by the Competitions Committee and approved by the Council were adopted by the General Body at the General Meeting of the 29th February.

The Council have decided to send a circular letter to every member of the Institute in respect of any competition concerning which the Competitions Committee consider that such a course is desirable, requesting him not to compete.

As an instance of the difficulty of awakening in the lay mind an appreciation of the value of correct dealing in the matter of competitions, the Council would report that, in view of the various unsatisfactory competitions for Carnegie Libraries, they wrote to Mr. Andrew Carnegie suggesting that he should insert in his future deeds of gift a condition that if the beneficiaries contemplated instituting a competition for the proposed building, such competition should be conducted according to the Institute's "Suggestions," and were met by that gentleman with a curt refusal.

At the opening meeting of the session Lord Windsor [*H.A.*], First Commissioner of Works, spoke encouragingly as to the possibility of forming an

Government Buildings. Advisory Committee to whom the architectural considerations involved in large building schemes might be referred by the Government. The Council have written to Lord Windsor a formal letter asking him to lay before His Majesty's Government their request that such a Committee should be appointed.

The Council understand that for some time past a Committee, consisting of the President,

Sir John Taylor, K.C.B., and Mr. John Belcher, A.R.A., has been requested by the Office of Works to advise them from time to time on various buildings of public importance.

Finance. The Council are glad to be able to report that the Institute continues to enjoy financial prosperity. A statement of income and expenditure, and the balance sheet for the year ending 31st December 1903, and the estimate of income and expenditure for the current year, are appended to this Report (pp. 365 *seq.*).

The balance of income over expenditure is £918. 11s. 4d., after the payment of a grant of £500 to the Architectural Association Building Fund.

The Council have this year invested the sum of £1,049. 5s. 8d. in the purchase of London & North-Western Railway stock. The total invested capital of the Institute amounts now to £14,000.

Miscellaneous. The Council have accepted an invitation from the Society of Designers that the President for the time being of the Institute should be an Honorary Member of the Society.

The Council have subscribed £5 to a memorial in Brussels to the late M. Valère Dumortier [*Hon. Corr. M.*], one of the founders of the Société Centrale d'Architecture de Belgique.

During the official year a telephone (P.O. 434 Mayfair) has been fixed in the clerks' office, for the use of the office and of members, and a telegraphic address ("Ribazo, London") has been registered at the General Post Office.

In concluding the Report the Council feel that the thanks of the Institute are due to the Standing Committees, the Competitions Committee, and to the Allied Societies and their representatives for the specially valuable assistance they have rendered the Institute during the past year.

REPORT OF THE ART STANDING COMMITTEE.

At the first Meeting of the Committee Mr. Macvicar Anderson was elected Chairman; Sir Wm. Emerson, Vice-Chairman; and Messrs. J. S. Gibson and W. D. Caröe, Hon. Secretaries.

The Committee has met four times, and the following subjects have received consideration:—

- Tintern Abbey.
- London Suburban Building By-Laws.
- Lambeth Bridge (proposed rebuilding).
- Southwark Bridge.
- Berwick-upon-Tweed Bridge.
- Peterborough Market Hall.
- London Building Acts (Amendment) Bill.
- Advertisement Abuse on Buildings.
- London Traffic Commission.
- The Wooden Pediment and Dome of Somerset House.

It will be seen that the question of bridge design has again occupied a considerable amount of the Committee's deliberations, and it has to express regret that this is owing both to the callousness of authorities in regard to ancient structures in their keeping, and to the general inability of the public to appreciate the fact that the construction of bridges, especially across great waterways, affords fine architectural opportunities. The Committee, in calling attention to the fact that the Lambeth Bridge rebuilding scheme is at a standstill, would take the opportunity of pointing out that nothing should be left undone to keep alive the architectural importance of this projected structure.

Southwark Bridge.—It is satisfactory to record that the Corporation of the City of London has realised its responsibility in this instance by appointing the President R.I.B.A. as one of the assessors in the proposed limited competition of architects and engineers for designs: thereby recognising that the æsthetic considerations involved are material to the community.

At Berwick-upon-Tweed some progress, on the lines urged by this Committee, has been made, and it is gratifying to record a hope that an historical and interesting ancient bridge will thus receive proper treatment.

Suburban Building By-Laws.—While reform is in the air the Committee has been hopeful that steps might be taken to assimilate the London Suburban By-laws with those regulating the area controlled by the London County Council. It is obviously ridiculous that building law should be more onerous in the suburbs than in the centre. At the Committee's suggestion the Council has taken steps to bring this important matter before the Local Government Board.

London Building Acts (Amendment) Bill.—The Committee, after careful deliberation, decided to limit its suggestions for the amendment of the London Building Acts to points involving strictly æsthetic considerations. The following amendments were proposed and have been adopted in their entirety by the Council and submitted to the London County Council:—

Section 59, Clause 1.—*Party walls above roofs.*—(a) In a building of the warehouse class every party wall shall be carried up of a thickness equal to the thickness of such wall in the topmost story above the roof, flat, or gutter of the highest building adjoining thereto, to such a height as will give a distance of at least three feet, measured at right angles to the slope of the roof, flat or gutter.

(b) In a building other than of the warehouse class, the roof whereof is constructed of fire-resisting materials, the party wall shall be carried up of a thickness of at least eight and a half inches, to the underside of such roof surface.

(c) In a building other than of the warehouse class, the roof whereof is constructed of inflammable materials, the party wall shall be carried up of a thickness of eight and a half inches above the roof, flat, or gutter of the highest building adjoining thereto, to such a height as will give a distance of at least fifteen inches measured at right angles to the slope of the roof, flat or gutter.

Section 59, Clause 2.—Every party wall shall be carried up of the thickness aforesaid, above any turret, dormer, lantern light, or other erection of combustible materials fixed upon the roof or flat of any building within three feet from such party wall, and shall extend at the least twelve inches higher and wider on each side than such erection, and every party wall shall be carried up above any part of any roof opposite thereto, and within four feet therefrom (b).

Section 61, Clause 1.—The flat, gutter and roof of every building and of every turret, dormer, lantern light, skylight, or other erection placed on the flat or roof thereof, shall be externally covered with slates, tiles, metal or other incombustible materials.

Section 61, Clause 4.—The plane of the surface of the roof of any other building shall not incline from the external or party walls upwards at a greater angle than eighty-five degrees with the horizon. Provided that this sub-section shall not apply to towers, turrets, or spires.

Supports under Superstructures.

In all buildings there shall be on all street frontages, piers or other supports, of stone, granite, brick, metal, or other approved materials, from the level of the ground to the level of the main wall of the superstructure above the ground, mezzanini or first floors, of a total breadth on each street frontage equal to the following:—

On frontages up to 20 feet wide, one-tenth part;

On frontages 20 to 32 feet wide, one-ninth part;

On frontages 32 feet and over, one-eighth part

of the respective widths of such frontages. No piers or other supports shall be placed further apart than 40 feet measured from centre to centre of such piers or other supports, and no single pier shall in any case be less than 18 inches on the face. Such piers shall not be covered with mirrors or otherwise concealed.

Projection of Cornices.

Section 73, Clause 2.—Every balcony, cornice or other projection shall be tailed into the wall of the building, and weighted or tied down to the satisfaction of the district surveyor, and no cornice shall exceed in projection two feet six inches over the public way except in streets 60 feet wide and over, where cornices may be projected three feet six inches over the public way.

Section 73, Clause 5, Sub-Section (d).—Are in no part nearer to the centre of the nearest party wall than the extreme amount of their projection from the main wall of the building to which they are attached, except with the written consent of the adjoining owners.

Projection of Oriel Windows and Turrets.

Section 73, Clause 6, Sub-Section (a).—*The face of such projections shall not extend more than three feet from the face of the front wall of the building, or more than 12 inches over the public way, exclusive of the cornices, mouldings, or other architectural features of such projections.*

Advertisement Abuse.—The glaring instance of a whole house covered with a permanent advertisement hoarding adjoining Bow Church in Cheapside has impressed the Committee as being a fitting opportunity for suggesting to the Council to urge upon the City of London, the London County Council, and City and Urban authorities generally, the importance of acquiring powers to regulate advertisement abuses, with a view of rendering impossible the permanent defacement of streets and buildings. The Committee would urge the Council to point out the illogical conditions which require rooms to have a definite window area, but permit them after erection to be blocked up by the display of offensive vulgarities destructive of architectural propriety and fitness.

London Traffic Commission.—The Committee has called the attention of the Council to the fact that no architectural authority has been as yet heard upon this matter, and has urged that steps should be taken so that the architectural aspects of street development and communication in greater London should be adequately laid before the Commission. It was pointed out that if a great architect's recommendations had been adopted two centuries ago there would probably have been now no reason for the existence of such a commission.

REPORT OF THE LITERATURE STANDING COMMITTEE.

Since the election of the present Committee, in June 1903, the Literature Committee have held eight meetings.

At the first meeting Mr. R. Phenè Spiers was re-appointed Chairman; Mr. H. Heathcote Statham, Vice-Chairman; Messrs. Leslie Waterhouse and A. Maryon Watson were appointed Hon. Secretaries.

The following Sessional Papers, arranged for by the Committee, have been read:—*"Le Trésor de Cnide et les Monuments de l'Art Ionien à Delphes,"* by J. T. Homolle [*Hon. Corr. M.*], on 16th November 1903; *"The Royal Victoria Hospital, Belfast: Its Inception, Design, and Equipment,"* by Wm. Henman [*F.*] and Henry Lea, C.E., on 14th December 1903; *"Architecture in Lead,"* by J. Starkie Gardner, on 18th January 1904; *"The Biological Disposal of Sewage from Isolated Buildings,"* by Professor Frank Clowes, on 15th February; *"Plaster Decoration,"* by J. D. Crace [*H.A.*], on 14th March; *"Notes on the Design and Construction of Buildings connected with the Generation and Supply of Electricity known as Central Stations,"* by C. Stanley Peach [*F.*], on 28th March; *"The Statues of Wells Front, with some Contemporary Foreign Examples of Sculpture,"* by E. S. Prior, on 18th April; and the following Paper has been arranged for the 16th May: *"The Planning of Collegiate Buildings,"* by the Rev. J. B. Lock, Bursar Caius College, Cambridge.

The Committee have to deplore the loss of one of their most distinguished members, Dr. Alexander Stuart Murray [*H.A.*], Keeper of Greek and Roman Antiquities at the British Museum, and a classical archaeologist of European repute. Dr. Murray has not only enriched the Proceedings of the Institute with many scholarly contributions, but by his frequent attendance at the deliberations of this Committee he has also rendered services whose value will not soon be forgotten.

The Committee desire again to acknowledge their indebtedness to the authors of the various reviews and articles contributed to the JOURNAL, and to the publishers who have contributed many interesting works to the Library during the year.

The extra grant of £25, again received from the Council, has enabled the Committee to extend the Loan Collection by the purchase of many much-needed works in duplicate, of the benefit of which the students who use the Library have not been slow to take advantage.

The Librarian reports to the Committee as follows:—

During the twelve months ending on the 31st March of the present year 211 volumes and 29 pamphlets have been added to the Library of the Royal Institute, exclusive of periodicals, reports, and Transactions of Societies, and parts of works issued in serial form.

The number of works presented to the Reference Library was 91. The works purchased comprise 120 volumes, out of which 62 volumes were added to the Loan Library.

The attendance of readers in the Reference Library during the year numbered 4,862 (last year 4,875). The number of works issued on loan was 3,020 (last year 2,609), 90 volumes having been issued to Fellows, 571 to Associates, 978 to Students, 884 to Probationers, 497 to Ticket Holders.

LIBRARY STATISTICS 1903-4.

DATE	DAY ATTENDANCES. 10 a.m. to 5 p.m.					EVENING ATTENDANCES. 5 p.m. to 8 p.m.					Books issued on Loan.
	Members.		Non-members.		Total.	Members.		Non-members.		Total.	
	Library.	Periodicals only.	Library.	Periodicals only.		Library.	Periodicals only.	Library.	Periodicals only.		
1903.											
April	54	24	143	14	235	41	19	80	9	149	246
May	75	19	124	9	227	42	16	91	16	165	261
June	81	20	137	13	251	35	9	71	16	131	199
July	76	14	112	12	214	23	9	50	6	88	165
August	Reference Library closed.					Reference Library closed.					34
September	91	18	120	13	242	51	9	64	10	134	215
October	84	8	168	18	278	63	10	147	9	229	371
November	99	7	147	12	265	55	11	114	13	193	297
December	112	14	127	9	262	47	14	87	10	158	276
1904.											
January	97	19	186	19	321	44	23	134	17	218	293
February	78	20	94	20	312	64	8	137	17	226	317
March	121	15	193	13	342	50	20	141	11	212	346
TOTAL	968	178	1651	172	2949	515	148	1116	134	1913	3020

The number of books issued through the post was 76. The number of tickets issued for admission to the Library, other than to members of the Institute or to Students and Probationers, was 81.

The additions which have in recent years been made to the Loan Collection have greatly contributed to the usefulness of this department of the Library, as the following statistics show:—

Year.	Books issued on Loan.	Year.	Books issued on Loan.
1896	853 volumes	1901	1,793 volumes
1897	920 "	1902	2,132 "
1898	1,073 "	1903	2,609 "
1899	1,163 "	1904	3,020 "
1900	1,447 "		

Donations have been received from Count Robert de Lasteyrie, Herr A. Streit, Prof. W. R. Ware, Mr. C. F. McKim, Don E. S. Fatigati, Herr F. C. Heimann, Mr. Wm. Glover, Herr J. Kotera, Monsieur A. Choisy, Mr. R. Phené Spiers, the Rev. D. H. S. Cranage, Prof. J. Otzen, Lieut. O. Olufsen, and MM. Pontremoli and Haussoullier.

Amongst the books presented or acquired during the year the following may be mentioned: Choisy's *L'Art de bâtir chez les Égyptiens*; Avena's *Monumenti dell' Italia meridionale*; Fournier

(E.) and others, *Paris à travers les Âges*; Fox-Davies's *Art of Heraldry*; Pontremoli and Haus-soullier's *Didymes*; Geymüller's *Baukunst der Renaissance in Frankreich*; Labarta's *Hierros Artísticos*; Lavallée's *Voyage Pittoresque et Historique de l'Istrie et de la Dalmatie*; Bowman's *Specimens of Ecclesiastical Architecture*; *Abbey Square Sketch Book* (8 vols.); Lasteyrie's *Études sur la Sculpture Française au Moyen Âge*; Durand's *Monographie de l'Église Notre-Dame Cathédrale d'Amiens*; Enlart's *Manuel d'Archéologie Française*, 2 vols.; Baldwin Brown's *Early Arts in England*; Brossard's *La France* (5 vols.); Streit's *Das Theater*; Gusman's *La Villa Impériale de Tibur*; and three volumes on Colonial Architecture presented by Mr. McKim.

The Institute Collection of Drawings has received an important addition by the purchase of two folio volumes of original drawings by the late Professor T. L. Donaldson, and by a series of measured drawings of ancient ecclesiastical and domestic work by W. Peart.

REPORT OF THE PRACTICE STANDING COMMITTEE.

The usual monthly meetings have been held, with one exception, and, in addition, three special meetings and ten sub-committee meetings for consideration of The London Building Acts (Amendment) Bill, 1904. All the meetings have been well attended.

The following officers were elected at the commencement of the Session:—Mr. J. Douglass Mathews (Chairman), Mr. A. H. Kersey (Vice-Chairman), Mr. C. H. Brodie and Mr. E. Greenop (Hon. Secretaries). It was with deep regret that the Committee found that Mr. S. Flint Clarkson's health would not allow of his continuing to take further part in the work of the Committee.

The London Building Acts (Amendment) Bill, 1904.—The greater part of the time of the Committee during the Session has been occupied by the consideration in detail of the present London Building Act 1894, with a view to suggesting amendments thereto, upon the invitation of the London County Council, for their consideration in the preparation of an amended Act for submission to Parliament. Much labour was involved in this, and, in addition to the ordinary meetings, three Special Meetings and ten Sub-Committee Meetings were, as already mentioned, held. At the instigation of the Committee a circular was sent to all the members of the Institute inviting suggestions for the amendment of the present Act. A large number of replies were received and considered by the Committee. The Committee reported very fully to the Institute Council, who then referred the whole matter to a Special Committee consisting of the Chairmen of the Art, Practice, and Science Committees, with two members of the Council. The final Report of this Special Committee was sent to the London County Council from the Council of the Institute.

By-laws of the Corporation of the City of London in relation to the Demolition of Buildings.—An expression of the views of the Institute upon the draft "By-laws of the Corporation of the City of London relating to the Demolition of Buildings" having been invited by the Corporation, the matter was referred by the Council to the Committee.

The proposed by-laws were considered in detail and a Report made. As the result of the recommendations in the Report, and their support by the Chairman (Mr. Douglass Mathews) in the Corporation, some valuable amendments were secured. As, however, the Corporation declined to give way upon certain items which it was considered imposed, as they stood, unnecessary and costly restrictions upon building operations in the City, the Committee recommended the Council to forward their objections to the Local Government Board. This course was adopted.

The Institute of Builders having expressed to the Council their desire to confer with the Institute in this matter, a Deputation from that Body was received by the Practice Committee, and expressed their agreement with the proposed amendments.

Institute Scale of Charges.—Two objections to the scale were raised by two members of the Institute, and suggestions were made that the schedule should be amended. The Committee fully considered the points raised, and decided that it was not advisable to again alter a schedule which had so recently been revised, more especially as the two cases brought to their notice could only under exceptional circumstances involve any hardship or difficulty.

By-laws of the London County Council made under the Metropolis Management Acts Amendment (By-laws) Act, 62 & 63 Vict. c. 15.—The Council referred to the Committee the letters of two members calling attention to the new by-laws made by the London County Council and approved by the Local Government Board in August last, and requested an expression of opinion as to how far architects were affected by these by-laws. The Committee reported to the Council that they entirely agreed with the correspondents that the by-laws in question required the deposit with the Sanitary Authorities of detailed drawings, involving much labour and expense in the case of sanitary alterations, even though of a trivial character. The Committee recommended that the Council should publish the letters, with their approval attached, in the *Institute Journal*, and send a copy of the *Journal* to the London County Council, the Local Government Board, and each of the Metropolitan Borough Councils. This was done. The Committee also recommended that, as the cost of satisfying these requirements falls ultimately upon the public, an official letter embodying the views expressed in the two letters should be addressed by the Council to *The Times*. This suggestion was not, however, adopted.

Miscellaneous.—The opinion of the Committee was asked by members on several matters of interest affecting the profession, and replies were in due course furnished.

REPORT OF THE SCIENCE STANDING COMMITTEE.

The Science Committee have held nine meetings, with an average attendance of eleven, since the publication of the last report. Mr. Lewis Solomon was appointed Chairman; Mr. Max Clarke, Vice-Chairman; and Mr. H. D. Searles-Wood and Mr. Bernard Dicksee, Hon. Secretaries.

The Report on the Brickwork Tests is in print and will be shortly published. The R.I.B.A. standard size of bricks has been finally agreed to, and comes into force on the 1st May 1904. The Committee, at the request of the brickmakers, are now endeavouring to standardise glazed bricks in harmony with the Institute standard. The Chairman has attended the meetings of the Joint Standard Committees which have standardised the rolled joist sections; the Chairman is a member of the Joint Committee which is now engaged in standardising the specifications and tests for Portland cement. At the request of the Fire Offices Committee they have under consideration the regulations relating to fire-resisting building with a view to making suggestions that may make these rules more useful.

The Committee reported to the Council on the Amendments to the London Building Act; and their draft by-laws for skeleton buildings, and supports under superstructures, have been forwarded to the London County Council.

FINANCES.

The accounts of Ordinary Funds for 1903, prepared by Messrs. Saffery, Sons & Co., chartered accountants, and audited by Messrs. Louis Ambler [F.] and W. A. Forsyth [A.], the Hon. Auditors appointed at the Annual General Meeting of 1903, here follow:—

Income and Expenditure Account of Ordinary Funds for the Year ended 31st December 1903.

Dr.

Exclusive of Entrance Fees, Final Examination Fees, and Subscriptions in advance.

Cr.

EXPENDITURE.				INCOME.			
To ORDINARY EXPENDITURE—				By ORDINARY INCOME—			
	£	s.	d.		£	s.	d.
Rent.....	935	0	0	Subscriptions—			
Gas and Electric Lighting.....	122	17	10	607 Fellows at £4. 4s.	2549	8	0
Coals.....	32	8	0	Ditto, Arrears.....	63	3	0
Salaries.....	1091	5	10	1,043 Associates at £2. 2s.	2190	4	0
General Printing, Stationery, Stamps, and Petty Expenses.....	1293	9	7	Ditto, Arrears.....	109	11	0
Expenses of General Meetings, Exhibitions, &c.	684	12	0	Ditto reinstated.....	31	10	0
Housekeeping.....	356	9	3	37 Hon. Associates at £2. 2s.	77	14	0
Advertisements.....	157	12	9	Ditto, Arrears.....	21	0	0
Examination Expenses.....	28	0	0	Dividends on Stocks and Shares—			
General Repairs.....	393	7	0	Architectural Union Co.	184	2	0
Fire Insurance.....	87	19	5	Consols $\frac{3}{4}$ per Cent.	60	18	6
Medals and other Prizes.....	34	11	0	Tasmanian Government Stock $\frac{3}{4}$ per Cent.	62	13	8
Grants to Library.....	185	4	0	Dominion of Canada 3 per Cent.	34	1	0
Grant to Architectural Association.....	125	0	0	Queensland Government 3 per Cent.	46	12	8
Grant to Royal Architectural Museum.....	100	0	0	Great Western Railway 3 per Cent. Pre- ference.....	35	3	8
Grant to Architects' Benevolent Society.....	21	0	0	Interest on Deposits.....	37	1	10
Grant to Lightning Research Committee.....	21	0	0	JOURNAL and KALENDAR—			
Grant to British School at Athens.....	21	0	0	Advertisements.....	825	0	0
Special Grant to Architectural Association Building Fund.....	188	0	0	Sales.....	114	11	10
The JOURNAL—				Sale of other Publications.....			
Reporting.....	50	8	0	Use of Rooms—			
Printing and Binding.....	684	11	1	District Surveyors' Association.....	25	0	0
Illustrations.....	185	17	3	Architectural Association.....	7	10	0
Addressing, Postage, and Carriage.....	254	0	10	R.I.B.A. Tenants.....	55	0	0
The KALENDAR—				Examination Fees—			
Printing.....	161	10	0	Statutory.....	30	0	0
Postage and Carriage.....	30	10	0	Preliminary.....	674	2	0
Contributions to Allied Societies.....	192	0	0	Intermediate.....	473	11	0
Miscellaneous (including Dinner).....	294	15	6	Special and Final (forfeited).....	172	4	0
Legal and Accountants' Charges.....	145	19	11				
To Album of Portraits of Past Presidents (in progress).....	50	15	2				
Balance of income over expenditure.....	71	2	2				
	918	11	4				
SAFFERY, SOXS & Co., Chartered Accountants.	£8305	12	3				

Examined with the several vouchers and found to be correct. 23rd March 1904.

(Signed) LOUIS AMELER [F.],
W. A. FORSYTH [A.].

Dr.

Balance Sheet of Ordinary Funds, 31st December 1903.

Cr.

LIABILITIES.				ASSETS			
	£	s.	d.		£	s.	d.
To Sundry Creditors outstanding.....				By Cash at Bank.....			
To Examination Fees anticipatory of elec- tion.....	212	4	8	By Investments at cost—			
To Subscriptions for 1904 received in ad- vance.....	128	0	0	Architectural Union Co., 243 Shares.....	3643	1	0
To Building Fund.....	76	4	0	Consols $\frac{3}{4}$ per Cent. £2200 10s.	2233	12	2
To Charitable Fund.....	1054	10	4	Tasmanian Government Stock $\frac{3}{4}$ per Cent.	2050	0	0
To Accumulated Fund—	195	14	0	Stock £1896. 8s. 3d.	2050	0	0
Surplus of liquid assets over Liabilities as per last Balance Sheet.....	11902	0	5	Dominion of Canada 3 per Cent. Regis- tered Stock £1200.....	1219	11	0
Add Entrance Fees received in 1903.....	326	11	0	Queensland Government 3 per Cent. Stock	1540	0	0
Arrears for 1903 (as per contra).....	224	14	0	£1643. 9s. 1d.	1540	0	0
Less Arrears 1902, since re- ceived or cancelled..... £253 8 0	12453	3	5	Great Western Railway 3 per Cent. Pre- ference Stock £747.....	1199	16	10
Furniture and Fittings bought.....	66	2	1	By Building Fund—			
	319	10	1	Indian Government Stock $\frac{3}{4}$ per Cent.	1054	10	4
	12133	15	4	Stock £973. 1s.			
Add Balance of Income over Expenditure in 1903.....	918	11	4	By Debtors (Rent and Advertisements).....			
	13052	6	8	By Subscriptions in Arrear 1902.....	69	6	0
SAFFERY, SOXS & Co., Chartered Accountants.	£14717	0	5	Ditto 1903.....	224	14	0

Examined with the several vouchers and found to be correct. 23rd March 1904.

(Signed) LOUIS AMELER [F.],
W. A. FORSYTH [A.].

(Signed) { LOUIS AMBLER [F.]
 { W. A. FOREYTH [A.]

Dr.		Balance Sheet of Trust Funds, 31st December 1903.		Cr.	
To ASHPITEL PRIZE FUND:—		£	s. d.		£ s. d.
Capital—20 Shares in the Architectural Union Company, Limited, at £14 per Share		280	0 0	By Government and other Securities for total cost value of Trust Funds invested	11242 3 10
Balance at credit of Revenue Account		24	2 0	By Balance Pugin Memorial Fund	6 17
To DONALDSON TESTIMONIAL FUND:—				By Cash in hands of Bankers	372 13 11
Capital—£72 L. & N.-W. Railway 4 per Cent. Preference Stock		89	0 0		
Balance at credit of Revenue Account		2	17 5		
To GOWIN HURBARY FUND:—					
Capital—£1030 Caledonian Railway 4 per Cent. Debenture Stock		1344	13 6		
Balance at credit of Revenue Account		82	3 6		
To GRISSELL LEGACY FUND:—					
Capital—£500 Great Indian Peninsula Railway 5 per Cent. Guaranteed Stock		513	14 10		
Balance at credit of Revenue Account		8	12 6		
To LIBRARY FUND:—					
Balance at credit of Revenue Account		22	12 3		
To OWEN JONES STUDENTSHIP FUND:—					
Capital—£2128 Midland Railway 2½ per Cent. Debenture Stock		£	s. d.		
		1773	0 0		
£1100 Great Western Railway 5 per Cent. Consolidated Stock		1900	12 0		
Balance at credit of Revenue Account		3673	12 0		
To PUGIN MEMORIAL FUND:—		171	7 2		
Capital—£1070 L. & N.-W. Railway 4 per Cent. Preference Stock		1342	12 6		
To TITE LEGACY FUND:—					
Capital—£1150 2½ per Cent. Consols		1109	1 6		
Balance at credit of Revenue Account		15	7 4		
To TRAVELLING FUND:—					
Capital—£1050 Madras Railway 4½ per Cent. Stock		1285	4 0		
Balance at credit of Revenue Account		19	9 5		
To ARTHUR CATES LEGACY FUND:—					
Capital—£1160 N.E. Ry. 4 per Cent. Consolidated Stock		1504	5 6		
Balance at credit of Revenue Account		22	19 4		
		£11621	14 10		£11621 14 10

Examined with the several vouchers and found to be correct. 23rd March 1904.

(Signed) [LOUIS AMBLER [P.],
W. A. FORSYTH [A.].

The Council submit an Estimate of Income and Expenditure of Ordinary Funds for the year ending 31st December 1904, exclusive of Entrance and Final Examination Fees:—

Estimate of Income and Expenditure for Year ending 31st December 1904.

EXPENDITURE		INCOME	
	£ s. d.		£ s. d.
Rent, Lighting, and Warming	1100 0 0	Subscriptions and Arrears	3100 0 0
Salaries	1760 0 0	Dividends on Stocks and Shares and Interest on Deposit Account	475 0 0
General Printing, Stationery, Postage, and Petty Expenses	690 0 0	Sale of Publications (other than JOURNAL and KALENDAR)	400 0 0
General Meetings, Exhibitions, &c.	350 0 0	JOURNAL and KALENDAR—	
Housekeeping (including Office Attendant)	155 0 0	Sales	120 0 0
Advertisements	60 0 0	Advertisements	900 0 0
Examination Expenses	400 0 0	Use of Rooms	85 0 0
General Repairs	175 0 0	Examination Fees—	
Fire Insurance	35 0 0	Statutory	30 0 0
Medals and other Prizes	130 0 0	Preliminary	675 0 0
Grants to Library	125 0 0	Intermediate	475 0 0
Other Grants	140 0 0	Special and Final (Extra Fees)	372 0 0
JOURNAL	1900 0 0		
KALENDAR	200 0 0		
Contributions to Allied Societies	300 0 0		
Miscellaneous (including Dinner and Album of Past Presidents)	265 0 0		
Legal and Accountants' Charges	100 0 0		
Estimated Balance	1250 0 0		
	<u>£8435 0 0</u>		<u>£8435 0 0</u>

REPORT OF THE HON. AUDITORS.

To The President and Council of the Royal Institute of British Architects.

In submitting our report on the accounts of the Institute for the year 1903, which we have had the honour to audit, we have pleasure in stating that the books have been kept in an admirable manner.

The Revenue Account shows a balance of income over expenditure of £918 11s. 4d., which is very satisfactory, considering that the expenditure was exceptionally increased by a grant of £500 to the Architectural Association's Building Fund.

A sum of £1,231 8s. 11d. has been invested during the year, making the total invested capital £12,950 11s. 4d.; and the income from investments was £460 15s. 4d., showing a steady increase.

The members' subscriptions exceeded £5,000—a record amount, which it is hoped may be augmented yearly.

The sum realised on the sale of the Institute publications was about £165 more than that of the previous twelve months. An increase of over £180 was received for advertisements in the JOURNAL and KALENDAR, which, under existing contracts, will be maintained.

We should like to suggest that the accounts for the Annual Dinner should be included in the general statements, and not kept distinct, as has been the custom hitherto.

We have observed that a sum exceeding £100 has been incurred in holding the annual exhibition of students' drawings, and we would further like to suggest for your consideration the desirability of arranging future exhibitions at the new premises of the Architectural Association, provided that the request of the Council of the Institute were favourably entertained.

In conclusion we heartily congratulate the Institute on its financial condition, and we trust that the present state of progress and prosperity may continue.

28th March 1904.

(Signed) { LOUIS AMBLER [F.]
WILLIAM A. FORSYTH [A.] } Hon. Auditors.

DISCUSSION OF THE ANNUAL REPORT.

Mr. JOHN SLATER, *Vice-President*, in the Chair.

THE CHAIRMAN, referring to the absence of the President, said that a special meeting of the Royal Academy was being held that evening, and the President, most reluctantly, was obliged to be away from the Institute Meeting. In moving the adoption of the Report the Chairman congratulated the Institute upon the very satisfactory state of its finances.

Mr. T. E. COLLCOTT, *Vice-President*, seconded the motion.

Mr. WM. WOODWARD [A.] said it would appear almost ungracious to allow the Report, voluminous as it was, to pass without some criticism, even if that criticism were adverse. As regards the financial portion of the report he thought the Institute should congratulate itself. Looking at the large balance in their favour, they were almost in a position to start a new building for the Royal Institute of British Architects, as the Surveyors' Institution had started and completed theirs in Great George Street. The first portion of the Report must engender feelings of deep sorrow and regret at the number of distinguished members they had lost during the past year. To read the names of those who had gone from them during the year was to call up afresh those feelings of sorrow which had already been given expression to from the Chair. With regard to the membership, they must be pleased to notice that there was an increase of 17 Fellows and 25 Associates—a total of 42; and although the additional number was small, he was sure they all welcomed the increase. With reference to the award of the prizes and studentships, he was sorry he had

not been able to be present when Mr. Gibson's criticism of the works submitted was read. He had inspected the drawings, and he quite agreed with every word Mr. Gibson said with reference to them. There was a very unfortunate following of what he might call the "thunder-and-lightning and fireworks" school, and he felt sure it did not redound to the credit of the architecture of the country. With regard to the reference to "Ancient Lights," he had had a telephonic message from Mr. Howard Colls that evening to say that he had been successful in the House of Lords in his case on the question of ancient lights,* judgment having been unanimously given in his favour and with costs. That decision was very satisfactory and must have a very important effect upon the action the Institute was taking in the matter of the Easement of Light Bill. With regard to the Building Regulations and By-laws, he was sorry to find there was no reference in the proposed alterations to the angle of 63½ degrees. If there was one portion of the Building Act which affected the aesthetics as well as the practicability of architecture, it was this unfortunate angle of 63½ degrees. It was a matter which the Institute should have insisted upon some alteration in, because when the Bill was under discussion they all saw what an unfortunate clause it was.

* *Colls v. Home and Colonial Stores, Limited*: Appeal from a decision of the Court of Appeal, 20th December 1901, which reversed an order of Mr. Justice Joyce of 20th December 1900. A note of the case is given on p. 375.

and they all knew what lamentable results had followed from it. Then he was sorry to find that the Institute in its recommendations had not proposed to extend the references to the tribunal of appeal. In his opinion, all questions affecting the Building Act of 1894 would have been very properly referred to the tribunal of appeal, because the Building Act Committee of the London County Council consisted of gentlemen many of whom were quite ignorant of matters affecting building! Therefore the more matters could be referred to gentlemen who did understand building the better for the architect—the better for the builders, and the better for the building owners. As regards the selection of the best architectural talent available for the proposed extensions to the British Museum, that must be a very important task imposed upon the Institute Council. The gentlemen to be selected were to be architects of “taste, skill, and efficiency.” He did not envy the Council in selecting gentlemen who were able to reach the required standard, but he hoped they would be successful. With reference to the President having been requested by the Bridge House Estate Committee to advise them in obtaining competitive designs for the architectural treatment of the new Southwark Bridge, he thought this was a case where the Council of the Institute might say that the competition should be open. It afforded an opportunity for rising talent.

THE CHAIRMAN stated that the Council had received intimations that day that in consequence of certain difficulties the Corporation had withdrawn their Bill for the present.

Mr. WOODWARD, continuing, and referring to the question of registration, said he would not say a word on the subject after the very happy announcement which was made from the Chair. He was sure that that announcement must satisfy every member of the Institute who desired to see fair play as regards registration. There was a reference in the Report to municipal authorities employing their own salaried officials to design and execute important public buildings. The matter had received the serious attention of the Council, and they referred to it as a growing evil. This surely depended upon the productions of those officials. No doubt the Council were in possession of information which had led them to conclude that the designs of those gentlemen were not such as they themselves would approve of. But if one looked around at designs executed by distinguished and eminent members of the profession one sometimes wondered whether the Institute was justified in stepping in to prevent the execution of works by municipal men, who after all might be thoroughly qualified to carry out designs in their respective localities. With regard to the standardisation of bricks, and members being requested to insert the R.I.B.A. standard size in their specifications, suppose they did specify them, and suppose the builder could not supply them, and suppose the brickmaker said he would not supply them, as he had made millions of bricks of another size; what was the architect to do? Among the Congresses mentioned in the Report there was a reference to the “International Congress of Hygiene and Demography.” He saw his friend, Mr. Langston, was present—and if there was a man in the Institute acquainted with the English language it was Mr. Langston—he should be very much obliged if Mr. Langston would kindly tell him what “Demography” was. He was very happy to find in the Report a reference to the erection of a memorial at Athens to their past President, Mr. Penrose, and also to the Institute memorial which had been placed in the Crypt of St. Paul’s Cathedral. It would be a pleasure to them all to be present at the unveiling of that memorial to their most esteemed departed President, Mr. Penrose. With reference to the competitions for the Carnegie Libraries, he noted that the Institute had made a communication to Mr. Carnegie

which he had met by a curt refusal. He took the opportunity to say incidentally, that he regarded Mr. Carnegie as a public nuisance. Whenever he had had an opportunity of recording his vote about Mr. Carnegie’s Public Libraries, or anybody else’s Public Libraries, he had always said no; they only encouraged idleness. Then there was a reference to the Advisory Committee, and when he found in connection with it such names as those of the President, Sir John Taylor, and Mr. John Belcher, he felt quite sure they were safe in the hands of those gentlemen. They no doubt exercised a very important influence on the works of architects. Having so much power with the Government it was a matter of great moment to the profession to know that the Advisory Committee consisted of men whose knowledge was extensive, whose criticism was valuable, and who had not confined themselves to the furtherance of any particular style of architecture, so that there should be no bias whatever in the advice they gave to the Government on these very important works. With regard to the finances, he had compared the financial statement of this year with the financial statement of last year. There was a slight rise, he was happy to see, in the salaries of the officials, and he was quite sure that there was a very much greater corresponding rise in the efficiency of those officials. Therefore he was sure they should not regret the rise. He could only regret that there was a rise in the salaries and emoluments of everybody but the architect. The architect’s 5 per cent. remained; the British workman’s tenpence had gone up to elevenpence, and he was sure architects would be very glad when $7\frac{1}{2}$ per cent. was substituted for 5 per cent. As regards the London Building Act amendments, he noticed in the Art Committee’s Report a very important clause with reference to the supports under superstructures. If this was adopted it would have a very serious effect on street architecture. In buildings of a commercial character glass was an important factor. The man who invested his capital in the erection of a very extensive building and paid a heavy ground rent, could not hope to recoup himself for his outlay without a good deal of glass. The proposal he referred to laid down certain areas of pier for different frontages. The one-eighth part of a frontage, say in Regent Street, or Piccadilly, or Bond Street, would be a very serious matter indeed. That every building should have apparent support was all very well, but for the man who had embarked a large capital in ground rents and other expenditure, to be compelled to have this four feet breadth of pier would be very objectionable. It would have been better if the Institute had merely expressed its opinion that piers should be as large as possible consistent with giving the building some legs to stand upon, it being left to the special circumstances of the case to give as much apparent support as possible. The amendment proposed with regard to projecting cornices was equally unfortunate. It would be better not to name any projection, but to let it be understood that the cornices must correspond with the width of the thoroughfare. As regards the advertisement abuse referred to by the Art Committee, he thought there was a great deal too much interference in such matters. About a week ago he was sitting enjoying a cigar outside the Café de la Paix in Paris, and, in addition to the people who were passing he had beautiful brilliant advertisements offered to him which afforded him the utmost enjoyment. Perhaps he could not do better than leave off at that point. He congratulated the Institute upon what he claimed to be its very excellent position. Its financial position was good. The work set forth in the Report showed that it was certainly more active and more alive to the interests of the profession generally than it was seven years ago, and he could only trust that its financial prosperity would continue, and that in a very few years they would have sufficient money to commence the building of a house for the Royal Institute

of British Architects, and that that building would represent, as it should do, the culture, the skill, and the ability, not only of the present members, but of the whole profession.

Mr. H. T. BONNER [A.], speaking of the important limited competitions, asked whether the Council approached the promoters first, or whether it was the promoters who took the initiative by writing to the Council. It seemed to him that the position the Council took up was to keep the important works within a certain charmed circle.

THE CHAIRMAN: What are you referring to?

Mr. BONNER mentioned the case of the British Museum as an example. It seemed to him that the Council had the selection of certain members, and that men outside the charmed circle had no opportunity of competing for those important works.

Professor BERESFORD PITE [Member of Council] asked to be allowed to explain. The Council was requested by the Government to supply a limited list of not less than six architects, and the Council proceeded to nominate those architects. The nominations were tabulated, and, looking through the list, it might be of interest to remark that seven in that list upon which the Council balloted for the purpose of reducing to six, were provincial architects; seven were architects not members of the Institute, and fifteen were London architects. That list was reduced by balloting to the number required by the Government. He thought that would answer the insinuation that there was a charmed circle.

Mr. BONNER asked if that method applied to all competitions.

THE SECRETARY replied that as soon as a competition was advertised, it was a matter of office routine to send an official letter to the promoters, with a copy of the Institute suggestions, and asking for a copy of the conditions for the Library file. In nearly every case that was done. If the conditions were not satisfactory, he drew the attention of the promoters to the offending clauses, and asked for their amendment.

Mr. BONNER agreed that that was a very good and wise course to pursue as regards general competitions, but his question was a direct question as to limited competitions—to competitions, for instance, like that for the rebuilding of Newgate. There was another important competition coming on, that for the building of the Wesleyan church-house at Westminster. How did the Council select competitors for such important competitions as those?

Professor BERESFORD PITE: There had been no such competition during the past year.

Mr. BONNER: That did not affect the question. He was only giving Newgate as an example. He did not refer to what occurred this year or last year, but he asked what was the rule—what was the custom, and how was the matter arranged? The National Memorial to Queen Victoria certainly ought to have been open to all British subjects. In that case the competitors were selected by the Council. How were they selected, and why were they selected?

Professor BERESFORD PITE said that the method of selection he had sketched in the case of the British Museum was followed four or five years ago with regard to the competition for the Central Criminal Court. There every member of the Council would make the required list of six, which resulted, of course, in a very large number of names, upon which a ballot was held, and the result arrived at. With regard to the Victoria Memorial Competition, the Council had nothing whatever to do with that. It was never brought before them.

Mr. WOODWARD, referring to the British Museum extensions, inquired how many of the selected six were members of the Royal Institute of British Architects?

THE CHAIRMAN: I do not think I can answer that ques-

tion at present. The Council's recommendations have not gone to the Government yet.

Mr. R. F. CRUSHOLD [F.], speaking with reference to the size of bricks, said he understood the length was exactly twice the breadth. Should not the length of the brick be twice the breadth, *plus* the thickness of the joint? In Flemish bond it did not much matter, but in English bond it was almost essential for good work.

Mr. EDWARD WOODWARD [A.] said there was one point in the Report which he thought might be emphasised at a general business meeting of this kind, viz. that with reference to Government Buildings [p. 358]. It said something for the change that was coming over the treatment of architectural questions in London, that the Government should be advised in such matters by a committee consisting of three members of the Royal Institute of British Architects. A Committee, consisting of the President, Sir John Taylor, and Mr. John Belcher, had been requested by the Office of Works to advise them on these matters. That paragraph in the Report was perhaps the most suggestive and the most promising for the future of the Institute. When Mr. McKim was over here last year, what struck him and us was the extraordinary difference which existed between the position of the qualified architect in the United States and the qualified architect in England, and more particularly in London. In that paragraph in the Report there seemed to be the germ for the reconstitution of the architect's position with regard to the general treatment of our big cities.

THE CHAIRMAN, before putting the Motion to the vote, said that with regard to the general progress of the Institute, there could be no doubt that it stood higher in general estimation and in official estimation than it had ever done before. There was one little note in the Report which showed the wide extent to which their operations were extending—namely, that the Institute of New South Wales had asked the Council to hold not only the Final, but the Preliminary and the Intermediate Examinations as well, in Sydney this year. That request showed that the Colonies were appreciating the efforts made by the Institute towards improving architectural education, and that the Colonial Architectural Societies were doing their best to get the young men over there to take advantage of it, and show what they had learned by presenting themselves for the Institute Examinations. With regard to what Mr. Woodward said about municipal authorities, there was no question of approval or non-approval of the work done by the engineer or surveyor, as the case might be, of some big provincial city. The matter had come before the Council through the provincial societies, who took a strong view on the point. They said—and, he thought, with a certain amount of justice—that in their opinion the Chief Engineer or Chief Surveyor of such a city as Sheffield or Manchester, for example, had quite enough work of his own to do without going in for the designing of monumental buildings for his city; and they thought—and, he thought, rightly—that in the case of such buildings it would be more desirable to put them to open competition than that the official of the municipal authority should have the carrying out of such large works. He could not help thinking that that would be the feeling of the municipal authority itself. With regard to the British Museum competition, Professor Pite had already answered the speaker who referred to it. In many cases the promoters of a public competition did not come to the Institute at all. In some cases the Government or the official body came and said in effect that they did not want to take upon themselves the selection of competitors for the buildings, and they asked the Council to help them. He need add nothing to what had fallen from Professor Pite to show that the Council endeavoured to get the full opinion of all its members in order to have a body of architects from whom to make a selection. With regard to the term "Demography," which

Mr. Woodward had asked the meaning of—and upon which Mr. Langston had not taken the opportunity of enlightening him—he had before him the report of one of the Congresses of Hygiene and Demography held in London, and here the term "Demography" was defined as "the science of statistics applied to the social well-being of the people." About the size of bricks, if Mr. Chisholm would refer to the *KALENDAR*, where the details were given, he would see that the length should be double the width, *plus* the thickness of one vertical joint. No remarks had been made with reference to the annual accounts of the Institute, and he could not help thinking that that might be due to the excellent services rendered to the Institute by the official accountants whom the Institute had employed. The Balance Sheets showed how very carefully Messrs. Saffery did their work, and he felt sure that the Meeting would pass a vote of thanks to them for their services as official accountants to the Institute.

The Report, seconded by Mr. T. E. Collett [F.], was then put to the Meeting and adopted *nem. con.*

Mr. W. M. Woodward [A.], at the close of the Meeting, observed that as some reference had been made to the Memorial to Queen Victoria, they would all be interested to know whether Mr. Aston Webb's design would ultimately be carried out, or whether they were to rest content with what they now saw, which, to his mind, formed a very meagre memorial to our great Queen Victoria.

MINUTES. XIII.

At the Seventieth Annual General Meeting (being the Thirtieth General Meeting of the Session 1903-04) held Monday, 2nd May 1904, at 8 p.m.—Present: Mr. John Slater, *Vice-President*, in the Chair, 23 Fellows (including 8 members of the Council) and 27 Associates (including 3 members of the Council): the Minutes of the Meeting held 18th April [p. 351] were taken as read and signed as correct.

The Hon. Secretary announced the decease of Percy Christian Gibbs, Associate, elected 1889.

The Secretary announced the election to Fellowship by the Council that afternoon of Edward Jenkin Williams, President of the Cardiff, South Wales, and Monmouthshire Society.

The Chairman made a communication to the Meeting respecting the Institute Committee on the Statutory Registration of Architects.

The Report of the Council for the official year 1903-04, a copy of which had previously been sent to every member resident in the United Kingdom, having been formally presented and taken as read, its adoption was moved by the Chairman and seconded by Mr. T. E. Collett [F.]. The Report was then discussed, and the Meeting

RESOLVED, nem. con., that the Report of the Council for the official year 1903-04 be approved and adopted.

A vote of thanks was passed to Messrs. Louis Ambler [F.] and William A. Forsyth [A.] for their services as Hon. Auditors; and Messrs. Sydney Perks [F.] and H. A. Crouch [A.] were nominated Hon. Auditors for the ensuing year of office.

A vote of thanks was passed to Messrs. Saffery, Sons & Co., Chartered Accountants, for their services in connection with the Institute accounts.

The Meeting authorised the Council to appoint Scrutineers to direct the election of the Council and Standing Committees for the ensuing year of office, and to report the result thereof to the Business General Meeting of the 6th June.

The existing Statutory Board of Examiners was re-appointed.

The Chairman announced that the Seventh International Congress of Architects would be held in London in 1906 under the direction of the Institute.

The proceedings then closed, and the Meeting separated at 9.30 p.m.

SOME REFLECTIONS ON ARCHITECTURAL EDUCATION AND EXAMINATION SUGGESTED BY THE PERUSAL OF THE REPORTS OF THE MOSELEY EDUCATION COMMISSION, 1903.

By W. HOWARD SETH-SMITH [F.]

DIFFERENCES among architects as to the need for a more general, more advanced, and more systematic training have happily ceased to exist. The late Mr. Arthur Cates's memorable articles in the *JOURNAL R.I.B.A.*, in 1900, on Architectural Education in the United States of America, his later essays on the French schools, and Mr. Bailey Saunders's contribution in the *Architectural Review* (No. 78) on the German system, have probably served, in great measure, to bring about this unanimity. It is devoutly to be hoped that the Education Board about to be established, which ought to be one of the most effective monuments to Mr. Aston Webb's term

of office as President, will discover amid this mass of information, and that now before us in the Moseley Commission Reports, sufficient and suitable material for an educational scheme well suited to the development of English architectural genius. It must, however, be borne in mind that many professional schools, some of university rank, already exist as a result of long experience and careful study of these foreign methods, and, as far as their funds permit, have been well organised under expert advice. These schools will naturally be jealous of external dictation. Nor is it desirable to endeavour too closely to co-ordinate their methods of training.

The primary principle traceable in the history and description of the American systems of education in particular is that of allowing each State, and, as far as may be, each authority, to work out its own scheme.

It is upon this principle that our new Education Acts have been based, and it is one which will commend itself to all who have true education at heart.

How this principle can be adopted consistently with the establishment of a uniform and final test of training sufficient to entitle a man to a place on the roll of qualified architects, is the problem to be solved. A standard of some kind must obviously be established; and, moreover, if it is to be effective it must be compulsory, whether applied to the membership of a professional body or to architects as a class; and happy the profession which is prescient enough to settle that standard, and to obtain powers to enforce it, before a number of rival qualifying bodies have been organised. Our profession is still fortunately without a competitor with the R.I.B.A. in its Final Examination.

The reports of the Moseley Commission and Mr. Bailey Saunders's article make it clear that, both in America and Germany, education has been purged of the evil incident to our English system of examinations. This is the result of the higher colleges and universities accepting the certificate of the examiners of the schools from which their students are drawn.

Professor Gregory Foster, of University College, London, in his report to the Moseley Commission (pp. 106-129) says:—

"It is a fundamental principle in America that the man who is fit to teach is also to be trusted to examine his own students. The external examiner and the external examinations system are practically unknown in the United States. The teachers are free, and being free are enabled to give to their courses a breadth and depth that would be impossible were they hampered by the knowledge that their students were to be tested by examiners who knew little or nothing of them. The tests and examinations for undergraduate students leading to the bachelors' degrees are conducted almost entirely by the individual teachers, and with the most satisfactory results . . . There seems to be an atmosphere of quiet study and scholarly work which is apparently continuous throughout the session, and remains undisturbed by feverish bursts of cramming such as characterise British colleges and universities. . . . The influence on the teacher is no less salutary; the American teacher thinks of his functions as a teacher and director of studies, while the British teacher is driven by force of circumstances to conceive and direct his work entirely in terms of examination. As long as examinations control the teaching, whether in

universities or schools in this country, so long will the teaching continue to be academic in the worst sense of the word, cribbed, cabined, and confined. . . . For the American teacher life in comparison is a leisurely one. He makes as much, if not more, educational value out of the blunders of his weaker pupils as out of the correct answers of the strong ones. He cares for the development of his class as a whole.

"Examination by external bodies or examiners . . . only exists for the purposes of professional qualification in certain States and for the purposes of admission to universities and colleges in certain other States. Even where it exists the evils that have been so strongly felt in this country have been largely guarded against. Thus an examination board has been formed by the association of colleges and preparatory schools (*i.e.* preparatory for the colleges and universities) of the Middle States and Maryland, for the purpose of instituting a common standard for admission to the colleges . . . and of holding one examination for the purpose of that admission. Great care has been taken that the examiners in each case shall be experienced teachers, and inasmuch as the examination for admission to colleges is the test of the work done in the preparatory school, a large proportion of the examiners consist of masters who have been teaching in one or other preparatory school.

"While this has been done in the east in order to obviate a multiplicity of examinations, and in order to remove the difficulties that beset the old-fashioned matriculation examination, which was mainly conducted by college or university professors, in the middle west an even more significant plan, known as the 'accrediting' system, has been originated, and this system is rapidly spreading into the east. The old matriculation examination was not only found to be an unsatisfactory test of the pupils, but was an actual bar to any satisfactory relations between the universities and colleges and the schools. The University of Michigan determined, therefore, to institute a list of high schools to be known as 'accredited schools,' from which school pupils who presented certificates of having satisfactorily passed the full four years' high school course would be received without examination into the university. One of the university professors of education has for his main function the visitation of schools with a view of testing their fitness to be placed on the accredited list. He is from time to time assisted by his professorial colleagues, who inspect the schools from the point of view of their special subjects. Schools that are found satisfactory in all respects are placed on the accredited list; others have their deficiencies pointed out to them, and are told that when these are remedied they, too, will be put on the list.

"When a school has been placed on the list it

is still subject to inspection. It receives a report from the university upon each student that it sends thereto at the end of his first session or first semester, as the case may be. The university reserves to itself the right to refuse a student who is found to be insufficiently prepared to go on with his studies, and also the right to withdraw from the accredited list the name of any school that is proved by the pupils that it sends up to have an unsatisfactory standard. The result of this is that in the States where it has been adopted the whole educational system has been unified and strengthened. The university is looked up to as a counsellor and friend of the schools, the university teachers learn much by continued intercourse with their scholastic colleagues, and *vice versa*.

"In this way the barriers that exist in many countries between the various grades of teachers are rapidly being removed, and, what is even more important, the teaching of all classes of teachers is thereby made more direct, more stimulating and attractive to the students. At the same time the accrediting system, as against the older system, leaves the teacher and the taught free, and thereby stimulates better training. So strong is the feeling in favour of this system in the middle west that even entrance scholarships to the colleges and universities are awarded by it. The entrance scholarships are allotted among the accredited schools, each school taking its turn and receiving as nearly as possible the number of scholarships proportioned to its own number of pupils and to the number who proceed from the school to the university.

"This evidence of the value of a course of study of fixed duration, carefully graded and carefully watched at every turn, is a signal triumph as compared with the sort of racehorse method that turns our schools into training grounds for the examination race that occupies a few days at the end of a boy's school career, and upon which his future is made to depend to an alarming extent. It is perhaps one of the most noteworthy contributions of America to educational progress. Its adoption indicates that America, at all events, realises that education is a slow process which must be spread over certain fixed periods of time; that there are no short cuts; that even though the boy may have acquired the requisite information to answer the questions of an outside examiner, it does not follow that he has been satisfactorily educated to the standard that the examination is supposed to represent.

"It is by means of an extension of the departmental system that the relationship between the professional schools in the universities to the faculties and departments of pure science has been determined. Speaking generally, each professional school is for the purposes of the curricula a departmental unit, having, so to speak, a

number of sub-departments within it; but the relation of the professional school to the departments of pure science is that of one department to another. By this means a tendency to specialise, let us say, the teaching of chemistry, in a medical or engineering direction, is obviated—chemistry for all classes of students is a matter of concern for the department of chemistry. It may be convenient, as already said, to group together under one teacher those who are studying chemistry with a view to medicine, or those who are studying chemistry with a view to engineering; but this is a very different thing from the method of organisation that is found over here in many places, whereby the future students of medicine, or the future students of engineering, while still students of pure science, are segregated from their scientific fellows. By this means, too, attempts to diminish the amount of pure scientific work to be done by the student are prevented, to the great advantage of the student and of his future profession. There is probably no subject of university organisation in this country that is so likely to lead to disastrous results as the failure to delimit the sphere of activity of the professional school."

The Institute has already adopted this principle as regards three of the professional teaching bodies of the United Kingdom, i.e. the Universities of Liverpool and Manchester and the University College of London, by accepting the certificate of the professor (in lieu of its Intermediate Examination) that the student has passed a first-class examination on the full college course in architecture, the R.I.B.A. Board of Examiners being represented at this examination to see that the standard is an equivalent one.

If this system were applied to all professional schools as they became "accredited" by the Institute the R.I.B.A. Intermediate Examination would gradually die out, and the Final might be revised and made more exclusively technical.

An equally beneficial reform in our procedure might be made by adopting the American plan of a joint Board of Examiners, comprised principally of teachers, to avoid the present diverse matriculation standards for the Universities. We know of one young architect who has had to grind through three such examinations in order to benefit by the professional courses of the respective universities.

Again, it is fully time that our professional schools established an entrance examination on their students' general education; and, here again, exemption in favour of the certificate of public and other schools, under proper safeguards, might be adopted with great advantage.

The present writer commends these Moseley Commission Reports to all interested in architectural education.



9, CONDUIT STREET, LONDON, W., 7th May 1904.

CHRONICLE.

Statutory Registration of Architects.

At the General Meeting last Monday, before proceeding to the business on the Agenda, the Chairman (Mr. John Slater, *Vice-President*), referring to the Resolution passed by the Royal Institute on the 4th January last—viz. "That a Committee, consisting of the Council of the Institute and representatives of the Allied Societies, be appointed to consider the principle of registration and to report thereon to a Special General Meeting"—stated that the Committee had been appointed, and had held one meeting—viz. on the 28th March—at which the following members were present:—

Mr. Aston Webb, R.A., *President*; Messrs. John Belcher and John Slater, *Vice-Presidents*; Mr. Alexander Graham, *Hon. Secretary*; Messrs. C. E. Bateman, A. W. S. Cross, F. T. Baggallay, E. T. Hall, Chas. Heathcote, Arnold Mitchell, Beresford Pite, G. H. Fellowes Prynne, W. H. Seth-Smith, John W. Simpson, Leonard Stokes, *Members of Council*; Messrs. R. S. Balfour, H. V. Lanchester, and Walter Millard, *Associate Members of Council*; Mr. Henry T. Hare, representing the Architectural Association; and the following representatives of Allied Societies:—Mr. Arthur Clyne (Aberdeen Society), Mr. Arthur S. Parker (Devon and Exeter Society), Messrs. J. T. Cackett and J. Walton Taylor (Northern Association), Mr. Herbert Davis (York Society), Mr. A. Hunter Crawford (Edinburgh Association), Mr. E. M. Gibbs (Sheffield Society), Mr. Howard H. Thomson (Leicester Society), Messrs. G. C. Ashlin, R.H.A., and W. J. Gilliland (R.I.A. Ireland), Mr. H. Dare Bryan (Bristol Society), Mr. A. W. Brewill (Nottingham Society), Mr. Arthur Harrison (Birmingham Association), Mr. J. W. Beaumont (Manchester Society), and Mr. H. K. Bromhead (Glasgow Institute).

It would be seen, continued the Chairman, that not only had the Council appointed, but they had secured the attendance of a large number of influential men in connection with the Institute.

The matter had been debated at considerable length at the first meeting, and a small sub-Committee had been appointed to go into the details of the question and get together the necessary facts, so as to enable the matter to be put before the General Committee. A further meeting had been summoned for the 10th May, and the whole matter was being thoroughly gone into with a view to reporting to the General Body as to the method of carrying out the proposed registration if it was possible to do so. The Council, concluded the Chairman, had thought it right that the Institute should know what had been done, and had authorised him to make this announcement.

New Nominations to the Vice-Presidents and Council.

The following nominations have been made by Fellows and Associates in accordance with By-law 30:—

AS VICE-PRESIDENT.

SAMUEL PERKINS PICK (Leicester)—nominated by James S. Gibson, George Hubbard, W. Gillbee Scott, Alfred W. S. Cross, *Fellows*; Walter E. Hewitt, Horace T. Bonner, C. E. Hutchinson, *Associates*.

AS MEMBERS OF COUNCIL.

ALFRED WILLIAM STEPHENS CROSS, M.A. Cantab.—nominated by George Hubbard, Edmund Woodthorpe, C. E. Mallows, John Murray, *Fellows*; G. A. T. Middleton, Walter E. Hewitt, C. E. Hutchinson, *Associates*.

FREDERIC RICHARD FARROW—nominated by George Hubbard, Edmund Woodthorpe, Alfred W. S. Cross, C. E. Mallows, *Fellows*; C. E. Hutchinson, G. A. T. Middleton, Walter E. Hewitt, *Associates*.

GEORGE HUBBARD, F.S.A.—nominated by Alfred W. S. Cross, Edmund Woodthorpe, C. E. Mallows, W. Gillbee Scott, James S. Gibson, *Fellows*; C. E. Hutchinson, Walter E. Hewitt, Horace T. Bonner, *Associates*.

CHARLES EDWARD MALLOWS—nominated by George Hubbard, Edmund Woodthorpe, Alfred W. S. Cross, John Murray, *Fellows*; C. E. Hutchinson, Walter E. Hewitt, G. A. T. Middleton, *Associates*.

WILLIAM GILLBEE SCOTT—nominated by George Hubbard, Alfred W. S. Cross, Edmund Woodthorpe, James S. Gibson, *Fellows*; C. E. Hutchinson, G. A. T. Middleton, Horace T. Bonner, *Associates*.

LEWIS SOLOMON—nominated by George Hubbard, Edmund Woodthorpe, Alfred W. S. Cross, W. Gillbee Scott, *Fellows*; C. E. Hutchinson, G. A. T. Middleton, Horace T. Bonner, *Associates*.

BUTLER WILSON (Leeds)—nominated by Alfred W. S. Cross, George Hubbard, James S. Gibson,

W. Gillbee Scott, *Fellows*; C. E. Hutchinson, Horace T. Bonner, Walter E. Hewitt, *Associates*. A further nomination of Mr. Butler Wilson has been received signed by Henry Perkin, George Bertram Bulmer, W. Carby Hall, John Wreghitt Connon, *Fellows*; W. H. Beevers, H. Ascoug Chapman, W. G. Smithson, *Associates*.

EDMUND WOODTHORPE, M.A. Oxon.—nominated by C. E. Mallows, Alfred W. S. Cross, George Hubbard, John Murray, *Fellows*; Walter E. Hewitt, C. E. Hutchinson, G. A. T. Middleton, *Associates*.

Special Election to Fellowship.

The Council at their meeting on the 2nd inst. elected the following gentleman to Fellowship of the Institute under the proviso to By-law 9:—

EDWARD JENKIN WILLIAMS, *President of the Cardiff, South Wales, and Monmouthshire Society*; of High Street, Cardiff.

Seventh International Congress of Architects, 1906.

Referring to the very successful International Congress of Architects recently held at Madrid, and reported upon by the Secretary of the Institute in the last number of the *JOURNAL*, the Chairman announced to the General Meeting on Monday that it had been unanimously resolved at the Madrid Congress that the next, the Seventh, Congress should be held in London in 1906. The Council had had before them that afternoon an application from the Bureau requesting the Institute to take charge of the Congress on the occasion, and the Council had consented to make the necessary arrangements. The Chairman thought members would be glad to know this, and was sure every member would do his best to make the Congress a success.

Obstruction of Light: House of Lords' Decision.

The Home & Colonial Stores Limited v. Colls was an action brought by the plaintiffs to restrain the defendant from erecting a building so as to obstruct the plaintiffs' ancient lights. The plaintiffs' building was at the corner of Paul Street and Worship Street, Finsbury, the part concerned being the Worship Street frontage. The premises which formerly stood on the site of the defendant's proposed building were 19 ft. 6 in. in height, and the defendant proposed to erect a building to a height of 42 ft., which the plaintiffs said would obstruct their lights. Mr. Justice Joyce, before whom the case came in December 1900, found that the erection of the buildings of which the plaintiffs complained had appreciably diminished the light which the plaintiffs had previously enjoyed, but that the plaintiffs had failed to prove

any actionable wrong. He dismissed the action with costs.

The Court of Appeal reversed that decision, holding that a right to ancient light was a right to the enjoyment not merely of sufficient light for the ordinary occupation of the premises either as a place of residence or for business, but of the full amount of light which had been enjoyed during the prescriptive number of years by the owners or occupiers of the premises. The Court ordered a mandatory injunction to pull the premises down so as to restore all the light that had been previously enjoyed. This injunction was stayed pending appeal to the House of Lords.

The appeal was twice argued in the House of Lords—on May 15, 18, 19, and 22 of last year, and again on December 8, 10, and 11. At the first hearing the House was constituted of the Lord Chancellor, the late Lord Shand, Lord Davey, and Lord Robertson. On the reargument Lord Macnaghten and Lord Lindley were added. Judgment was unanimously given for the appellant on the 2nd May, with costs both in the House of Lords and below. The Lord Chancellor, in giving judgment, said that if the law were as laid down by the Court of Appeal it would be very far-reaching in its consequences; the application of it to its strict logical conclusion would render it almost impossible for towns to grow, and would formidably restrict the rights of people to utilise their own land. If the broad proposition underlying the judgment of the Court of Appeal were true, it was not a question of 45 degrees, but any appreciable diminution of light which had existed uninterruptedly for twenty years constituted a right of action, and gave a right to the proprietor of a tenement that had had this enjoyment to prevent his neighbour building on his own land. That, in his Lordship's view, was not the law. Light, like air, was the common property of all; it was the common right of all to enjoy it, but it was the exclusive property of none.

As regards *Warren v. Brown*—which Mr. Justice Joyce followed, and which had not then been reversed by the Court of Appeal—the Lord Chancellor stated that in his judgment that case was rightly decided by Mr. Justice Wright, and ought to have been affirmed by the Court of Appeal.

The judgments delivered in the House of Lords will be found in *The Times* of the 3rd May.

REVIEWS.

HOW TO READ A BUILDING.

How to Judge Architecture: A Popular Guide to the Appreciation of Buildings. By Russell Sturgis, A.M., Ph.D., Fellow of the American Institute of Architects. 80. Lond. 1904. Price 6s. net. [Macmillan & Co.]

Such a title as "How to Judge Architecture" irresistibly recalls to mind that familiar initial clause in the cookery-book recipe, "How to Cook a Hare." How to judge architecture—when you have encountered it and recognised it—might prove to be a useful enough piece of knowledge, to some people; but how, from Mr. Sturgis's book—which, by his subtitle, he designates "A Popular Guide to the Appreciation of Buildings"—this particular knowledge is to be acquired may perhaps yet remain a secret to many readers even after careful perusal of the volume. To be sure, he begins by telling us, "One can never be too patient in trying to train the mind to judge of the works of architecture," and that "it is very easy to hinder one's growth in knowledge by being too ready to decide." "The reader," he says, "must feel assured that there are no authorities at all in the matter of architectural appreciation; and that the only opinions, impressions, or comparative appreciations that are worth anything to him are those which he will form gradually for himself." "He will, moreover, hold them lightly even when formed; remembering that, in a subject on which opinions differ so very widely at any one time . . . there can be no such thing as a final judgment." "The object of this book," he adds, "is to help the reader to acquire such an independent knowledge of the essential characteristics of good buildings, and also such a sense of the possible differences of opinion concerning inessentials, that he will always enjoy the sight, the memory, or the study of a noble structure without undue anxiety as to whether he is right or wrong. Rightness is relative."

With the above object the author chooses first "some buildings of that class about which," he tells us, "there is the smallest difference of opinion among modern lovers of art—viz. the early Greek temples." From these he carries us along through the centuries with a sort of running historical commentary—in short runs with long jumps—on more or less notable examples of building, in Western Europe and America, right down to the New York Life Insurance Office, St. Paul, Minnesota. Still, the secret, "How to judge architecture," seems to be kept undisclosed to the last. At the same time we are told that this "is not a history of architecture, but in a sense a history of the modern way of judging of architecture"—truly, another story!

Taking the book to be as just described by its author, we find it to consist of ten chapters, illustrated by some sixty photographic views of

actual buildings, or portions thereof, together with a photograph of a model, reproductions of three book illustrations and three small plans—these last, somewhat significantly, being unmentioned in the Illustrations list, as though inadmissible under such a title in a book on architecture.

For the benefit clearly of non-professional readers, a certain modicum of elementary instruction in architecture is sought to be conveyed by means of occasional foot-notes, in which technical terms paraded in the text are more or less obscurely defined by the help of other terms and descriptions, themselves often needing clearer explanation for any readers to whom the teaching in the notes would not be altogether superfluous. Certain of the definitions might not meet with full and universal acceptance, nor could every statement in the text be taken without question. We learn, for instance, amongst other lore, that "the structure of the Greek temple had no windows to open in the wall"—regardless of the Erechtheum; and that "The Gothic, beginning as early as 1290 (*sic*) in England, is of extreme beauty in a simple, quasi-domestic, less grand and less perfectly developed way than the French." It sounds like something new to hear that, for the Cathedral of Chartres, "a tower undoubtedly planned for a larger and higher mass than any one of the flanking towers . . . was to have risen from the 'crossing,' thus making 'seven square towers' to the building—in spite of Plate XXX. clearly illustrating one of those that flank the apse, and go to make up the eight already existing towers this church possesses. Somewhat new, too, is it to read of "the Risorgimento"—as the author would have us English students take care to say, when tempted to use the Frenchified word Renaissance—of "the Classicismo," "the Rebirth," "the Rinascimento," "the Rocaille," and "the Decadenza." One might have thought that our text-books were full enough already of experiments in architectural nomenclature, that hopeless by-path in architectural study leading anywhere but to a real knowledge of architecture or to the power of judging it.

By way of encouragement to the would-be student, "doubts are suggested" with reference to the comparative merits of Greek temples, "in order that the reader may see in this commencement of his studies what kind of unsettled and never-to-be-settled questions will come before him at every step of his inquiry." He is told that "comparison among works of very high excellence can never cease—can never be brought to an end by any authority or any outside decision whatsoever, and that here the student's own preferences must be perforce his only guide." And this is how to judge architecture!

How to read a building would perhaps be found a more profitable subject for inquiry, whether by

professional student or by amateur; and the cultivation, by architectural students, of mere preferences and prejudices for particular forms and features in building-work of the past might at length, with advantage, be at least supplemented—if not supplanted—by a more intelligent reading of buildings as organic structures, growing out of the creative needs and the governing conditions in each case. The whole study of architecture can hardly be comprised in contemplating just the outsides, or the insides, of buildings, and proceeding to employ technical terms about them—doing exercises in architectural nomenclature. Book-fed students are only too ready to accept and use mere names for things, as though these really weighed in the scales of knowledge.

How to read a building accurately as a whole, as a unit, to get to know all about it, or at any rate all that it is possible to learn of the structure, to trace its genesis and its growth, and to note its descent and its kinship, would be something worth learning. In such case, to know must be a greater accomplishment, one would think, than merely to prefer.

It has been said of the true man of science that his motto should be that of Spinoza: "Neither to dislike nor to like, but to understand." The power to rightly judge architecture must depend upon ability to understand a building rightly as an organic structure; and this can only come to minds constituted and trained accurately to observe and to apprehend clearly the conditions governing a building—to weigh and appreciate the facts, the forces, and the fancies that combine in the making of a work of architecture.

WALTER MILLARD.

STRESSES.

The Elementary Principles of Graphic Statics. By Edward Hardy. 80. Lond. 1904. Price 8s. net. [B. T. Batsford.]

Stresses and Thrusts. By G. A. T. Middleton. 3rd Ed. 80. Lond. 1904. Price 4s. 6d. net. [B. T. Batsford, 94, High Holborn, W.C.]

Two books on Stresses have recently been published, one of rather elementary character called *The Elementary Principles of Graphic Statics*, by Mr. Edward Hardy, a certificated teacher of building construction; and the other, of a somewhat more advanced description, by Mr. G. A. T. Middleton, who is well known to architects as the author of several architectural text-books.

In reading *The Elementary Principles of Graphic Statics* one cannot help recalling how many years have passed since Professor Adams published his series of lectures on "Strains and Stresses in Ironwork," which probably was the first book of its kind to make unwilling students take some slight interest in this subject. That was written in the form of short chapters or lectures, with questions at the end of each lecture

bearing on the lesson the chapter contained. The little book under review is written in the same method of short chapters and questions to each chapter; but while the writer evidently understands his subject, he is not always able to impart his knowledge to the student. No doubt his lectures are good, as any misgiving as to his meaning can be at once cleared up; but his writing is somewhat involved, and not simple enough for a hurried student to understand—and students are always in a hurry—so that a young man is hardly likely to get the full benefit of the work, in spite of the many diagrams which completely illustrate the subject. Take, as an example, the following sentence: "The triangle of forces is most useful in the solution of levers when the forces acting on them are not parallel." This careless mode of expression occasionally makes the reading unpleasant; but there is behind this an abundance of matter useful to the student, who will be well repaid for the time spent on its perusal if he really wishes to grasp the subject; and this is approached from such a different starting-point from that taken by Professor Adams that the two works really help the understanding of each other.

Mr. Hardy's book begins with the simple study of graphic arithmetic. From that the author proceeds to describe what is meant by the terms Force and Moments and Reactions, and shows how to work graphically the calculations in connection with levers, and how to find the centre of gravity. In the chapter on the centre of gravity is the explanation of what is known as Bow's system of notation. Prior to Bow's time, no doubt there was a considerable amount of knowledge of graphic statics; but he was the first to simplify the subject and bring it within the capacity of the ordinary student by the system he adopted of lettering each angle or space formed by the external forces instead of lettering the extremity of each force; for instance, in the diagram of a king truss roof, if the street were called AB, A and B would not mean the two extremities of the street, but A would be the space in the triangle bounded by the principal, the street, and the tie rod, while B would be the space in the triangle bounded by the principal, the street, and the king post. This gave the corresponding impetus to this subject that the Arabic notation of numerals gave to mathematics when it replaced the old Roman or letter notation.

This chapter the student should study thoroughly, although unfortunately from the style of language he will have to read many portions several times over before he succeeds in mastering the context. The note as to tension in a string being the same if a force of 10 lbs. is pulling at one end or each end is useful, as students do not always realise this. Following on the relation of Bow's system is the description of the parallelogram of forces, which is well written.

In this chapter there is a very useful and simple method for the calculation of retaining walls, of considerable use to architects, and the student should work out the example at the end of the chapter. After short descriptions of funicular polygons and reactions, and bending moments, we get a chapter on shearing or transverse strain treated graphically by bending moments—a more precise method of treating the subject than by formula, although possibly not so ready for every-day use to the untrained mind. The last chapter is on reciprocal diagrams, which are described in an interesting manner step by step, so that although this subject has been explained by many writers, not one has treated it more clearly. On the whole, the young man who wishes to really master the subject will do well to read this book, although it sadly wants re-editing to fill in the *lacunae* and simplify the composition.

The other work under review, *Stresses and Thrusts*, by Mr. G. A. T. Middleton, is already in its third edition, proving that it supplies a want. It is one of his series of text-books for students' use, and although treating on kindred subjects to Mr. Hardy's, the method of description is quite different, Mr. Middleton's work appealing more to the reasoning faculties than to mere mechanical knowledge, and being accordingly of more use to the student who has passed the elementary stage. *Stresses and Thrusts* also starts with an explanation of elementary principles, and the learner having mastered these is informed fully and clearly about stresses in beams and flanges, and ascertains how it is that the ordinary formula for beams in transverse strain is always $W = \frac{c b d^2}{l}$. Mr.

Middleton makes the constant for fir = $3\frac{1}{2}$ cwts. This value of c has been shown by Kirkaldy's experiments to be too high, and for ordinary timber c had better be taken as from 2 to $2\frac{1}{2}$; the reason why it used to be given as $3\frac{1}{2}$ being that the small samples on which experiments were made in former days did not and could not possess the same defects as show themselves on actual beams some twelve or more feet long. He then proceeds to give the method of designing steel joists and framed girders, very useful to students, although not given so fully as in Adams's *Constructional Ironwork*. In his chapter on columns and struts he refers to Gordon's formula as being as correct as any other. It is of course known that this formula was not written by Gordon, and it is doubtful if it is as correct as some others; still, on the whole, it is perhaps the safest formula to use. This chapter is extremely interesting and of great use, showing the comparative advantages of different sections of metal.

In the next chapter, on framed cantilevers, is a short description of Bow's system of notation, which is written in a very clear and interesting way, and is probably the most pleasing part of

the book, helped as it is by ample diagrams. "Roofs" come next under consideration, and the diagrams illustrate their design in a comprehensive but not in an elementary manner. In his sketch of a collar roof he explains what is so often forgotten, that the collar is really in compression and not in tension, and accordingly quite distinct from a tie-beam, which is in pure tension. He states in the chapter on foundations that the safe load to put on stock brickwork in mortar is two tons to the foot; that is as far too low as his figure for clay is too high—viz. four tons to the foot. There is a short description of a factory chimney shaft, and there are short chapters on retaining walls and arches, with a few examination questions at the end from the R.I.B.A. Intermediate and Final Examinations, as also from the Admiralty Examination. This book is full of useful information, especially to the young man studying for examination; but inasmuch as many of the subjects on which the author treats are necessarily, from the small size of the work, only slightly gone into, and as no particular method of procedure is consistently followed throughout, the general effect after perusal is somewhat disappointing. What is written, however, is clear and well explained, as one expects in a work by Mr. Middleton; but if a fresh edition is produced many of the chapters will bear amplifying, so as to connect them with what has previously been explained and what follows, and to avoid the book having the semblance of a series of short articles on sundry subjects.

LEWIS SOLOMON.

SCAFFOLDING

Scaffolding: a treatise on the design and erection of scaffolds, gables, and stayings. By A. G. H. Thatcher. 8s. Lond. 1904. Price 5s. [B. T. Batsford, 94 High Holborn.]

This work is probably the first ever written on this subject; so that while it justifies Solomon's saying, "Of the making of books there is no end," it seems to disprove his assertion that "There is nothing new under the sun." But, Solomon or no Solomon, this is a very good and acceptable book, and comes when it is wanted; nor (in view of the recent Workmen's Compensation Acts) a day too soon.

Few architects could construct a scaffolding properly by themselves. The work has been generally so well done by contractors as neither to need nor receive attention from the architect, who, it must be allowed, has generally quite enough to think of, without either noticing or understanding exactly how ropes are lashed and knotted round scaffold poles and ledgers.

But may it not with equal truth be said that a great Admiral or General has more than enough to do without rummaging in stores of old rope

ends, or sniffing at canisters of preserved meat? Yet one of Lord Nelson's last orders, before receiving his death-wound at Trafalgar, was about a piece of rope; and the great Napoleon, through neglecting to provide for such "trifles" as the feeding of his army, was forced to make that disastrous retreat from Moscow which ruined his career. If we may believe the reports from the seat of war, the lordly Generals and luckless Admirals of Russia have been as contemptuous as the persevering and plodding little Japs have been cautiously careful with regard to every practical detail of commissariat equipment and outfit for the present campaign.

In view of such warnings and examples—not to despise the day of small things—the architect will sit wisely at Mr. Thatcher's feet, and learn, as this book so clearly and ably teaches, the art and science of building (by both northern and southern systems) scaffolding, derrick staging, ganties, travellers, shoring, hanging-stages, shear-legs, ladder-scaffolds, chimney and steeple staging, painters' boats, slaters' trusses, cranes, pulleys, guys, cordage, knots, hods, buckets, trestles, barrows, chains, spikes, and the scores of other implements, tools, and "wrinkles" generally, which are brought into requisition in order to give effect to the architect's designs.

The book is replete with information on all these points; and incorporates, with much that is familiar to practical building but fresh to literature, a readable chapter or two on strength of beams and posts, and on mechanical problems concerning centre of gravity, stability, wind-pressure, &c., &c., which are, though trite, quite in place in this neatly compacted, and well ordered and indexed, useful little volume, deserving a place in every architect's library.

Sunderland.

FRANK CAWS.

ARCHITECTURAL GLOSSARY.

Handbook of Technical Terms used in Architecture and Building. By Augustine C. Passmore. 8s. Lond. 1904. Price 7s. 6d. net. [Scott, Greenwood & Co., Ludgate Circus.]

In agreeing with the compiler of this glossary that there is room for yet another, we cannot forget that the undertaking of the glossary which is to supplant those we now have is a bold venture, and, from the nature of things, can be satisfactorily attempted but by the very few who have not only the faculty of using the luminous work, possible only to those whose knowledge is intimate, but who have also the power of condensing such knowledge.

It is a comparatively easy thing to define scientific terms—wherein there is nothing elusive, nothing continuously seeking to avoid our grasp—for this is done in the customary language of science; but, as regards matters appertaining to Art, as regards words living in an atmosphere

historical or traditional, the case is different: such can be glossed only by the scholar whose knowledge of them is part of his own atmosphere or history.

Thus that section of the glossary having to do with building construction, fortification, mining, metallurgy, electricity, geology, and chemistry, &c. seems to be particularly exhaustive, even to the inclusion of such out-of-the-way words as crichtonite, davina, guerite, osmium, quink, &c., which, having but slight connection with architecture or building, yet are rightly included in any work which aims at completeness.

While such evident care has been bestowed to include any word having a possible claim, we are sorry that among others the words Berkefeld filter, co-efficient, expanded metal, felt, funicular polygon, gesso, graphic statics, loose box, radius of gyration, septic tank, solenoid, and sublet, &c., have escaped attention, and that mistakes should have been made in the spelling of many botanical names. The author has not always been successful with words bearing on architecture and the kindred arts; many of his explanations are misleading and seem to indicate an amateur's knowledge of the subject; for instance, when "Della Robbia ware" is described as "an earthenware founded on terra cotta, so called after the reviver of the art," it seems as if the author considered Mr. Harold Rathbone was in some way connected with the Della Robbia family; again, clearstory windows are defined as "those that have no transom," notwithstanding the many examples we have to the contrary; wash-out and wash-down closets are confused under the same definition, and waste pipes "either discharge their contents directly into the house drain or into the soil pipe"—surely a double error.

Some of the glosses are spoiled through the misuse of a single word, flying buttress being described as "an arched brace of masonry, &c."—to most readers the use of the word brace would suggest the idea of tension, an idea quite foreign to the conception of a flying buttress; again, martlet in heraldry, "a bird without legs or beak," the use of the word bird here is inexact, for it is impossible to convert every bird into a martlet by any process of excision; another word could be found which, if used in the definition, would have expressed the idea of a martlet more exactly. Criticism such as this would be censorious, were it not that so many of the definitions could be improved by a more fastidious care in the choice of the right word.

Few of the comments are seriously incorrect, but the author has fallen into a common error when he says that "half the thickness of a party wall belongs to the adjoining owner." We are under the impression that no such thing exists as two halves of a party wall in different ownerships; the owners are partners of the whole party wall.

Perhaps the most difficult task the author has had was the construction of terse definitions of certain architectural styles and phases: to have written a page in defining the word Romanesque, for example, would have been comparatively easy, but to condense the explanation to about half a dozen lines in a glossary, and yet to retain the leading ideas denoted by the word, is wellnigh an impossibility. It is here that the glossary is weak, perhaps excusably; for instance (giving the explanations verbatim and in full), "Roman style of architecture—characterised by an arch with columns attached to the front." "Latin style—in this style the arch is mounted upon columns." "Revived classic Roman architecture is characterised by windows encased in diminutive Greek fronts;" "and Parisian"—this is our first introduction in this sense—"is characterised by outstanding coupled columns and a cut pediment," and so on.

We fear that such definitions can be of little use to anyone.

A sense of proportion is lacking in the treatment of important words of this class. Romanesque architecture, Venetian style of architecture, Gothic style, entablature, &c. are dismissed with four lines or less each, whereas the comparatively unimportant word peat has twenty-four lines, rainwater sixteen, granulated cork paint fifteen, booster nineteen, &c.

As an illustration of a gloss which is none at all, let us consider the following: "Wreath in heraldry, the part between the mantle and the crest, also called a torse." As an explanation of wreath it is none; all we learn is that a wreath is "a part" and that its position is between a mantle and a crest—whatever they may be, as neither of those words is given in the glossary, for it must be remembered that if a glossary is to serve its purpose, it must be of use to the unlearned. We should have liked a few authoritative words on the original use of a wreath, which would have shown by implication the absurdity of the modern twisted sausage everywhere seen.

It was a surprise to find that "taking in washing" was defined; this suggested that "ghost" and "fake a perspective" might be included, but they were not.

W. E. VERNON CROMPTON.

ALLIED SOCIETIES.

THE MANCHESTER SOCIETY.

Annual Meeting.

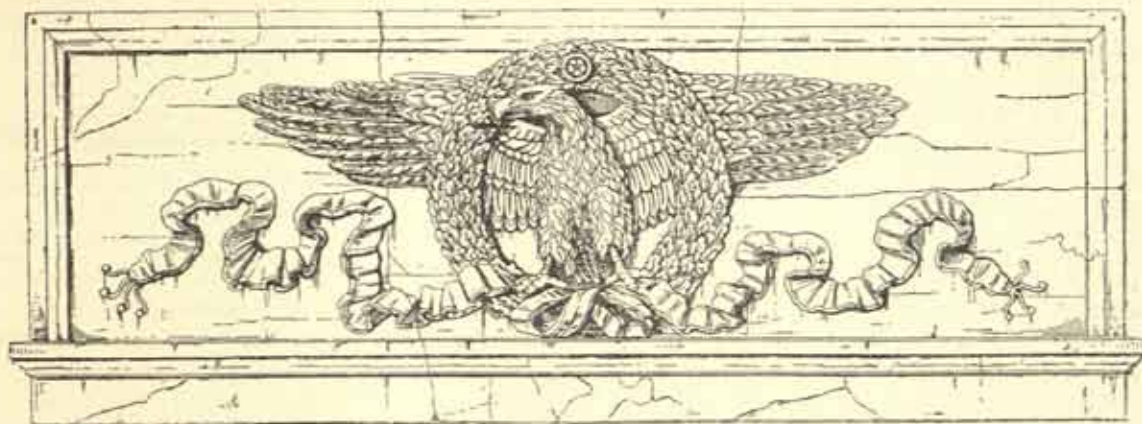
The Annual General Meeting of the Manchester Society of Architects was held on the 28th April, when the Fortieth Annual Report of the Council

was submitted, together with the financial statement and reports of the standing committees. The aggregate membership, the Report states, is 207—consisting of 103 Fellows, 51 Associates, and 53 Students—as against 193 at the date of the last report. The Council records its resolution in favour of the statutory registration of architects and urging the R.I.B.A. Council to take steps to bring it about. Additions have been made to the Society's Articles of Association with a view to facilitating the alliance of neighbouring Societies of Architects to the Manchester Society. The Blackpool and Fylde Architectural Association have already been admitted under the new regulations. Several appeals have been made to members and other practising architects in the neighbourhood for subscriptions to the endowment fund of the recently inaugurated Chair of Architecture at the Victoria University, Manchester, but so far only £200 has been received, and the profession is reminded that the fund is still open. The Society is represented on the advisory committee of the School of Architecture by Mr. J. W. Beaumont [F.] and Mr. Paul Ogden [F.]. The Education in Architecture Committee report that Mr. A. E. Corbett [A.] has in hand the preparation of a map of buildings of architectural interest in the neighbourhood. A first proof is shortly to be issued, and members are asked to revise any section with which they are acquainted; the map, it is hoped, may serve as a guide to the antiquary, and be a help to the architectural student in search of subjects for study. The following officers and Members of Council were elected:—*President*: Mr. J. W. Beaumont [F.]; *Vice-Presidents*: Messrs. W. A. Royle [F.], and John Eaton, C.D. [F.]; *Hon. Secretary and Treasurer*: Mr. Paul Ogden [F.]; *Assistant Hon. Secretary*: Mr. George Brown; *Members of Council*: Professor S. H. Gapper [A.], R.C.A., Messrs. John Ely [F.], Edward Hewitt [F.], Jesse Horsfall [F.], A. H. Mills [A.], J. D. Mould [F.], Isaac Taylor, John H. Woodhouse [F.], P. S. Worthington [A.], A. E. Corbett [A.], J. H. Gibbons [A.], Godfrey Colles.

THE ABERDEEN SOCIETY.

Annual Meeting.

The Sixth Annual Meeting was held on the 1st March 1904, when the Report of the Council was submitted and adopted. The membership of the Society stands at twenty-one. The following are the office-bearers and Council for 1904-05:—*President*: Mr. Arthur Clyne [F.]; *Vice-President*: Mr. Robert G. Wilson; *Council*: Messrs. Wm. Kelly, Harbourne Maclellan, G. Bennett Mitchell, James B. Nicol, George Watt; *Hon. Secretaries*: Messrs. A. H. L. Mackinnon [A.] and John Rust.



ON THE PLANNING OF COLLEGIATE BUILDINGS.

By the Rev. J. B. LOCK, M.A.

FELLOW AND CHURCHMAN OF GONVILLE AND CAIUS COLLEGE, CAMBRIDGE.

Read before the Royal Institute of British Architects, Monday, 16th May 1904.

IT is a bold action on my part to presume to speak on an architectural subject before this the leading Society of British Architects, even when I am fortified by the request of your President, and I must premise that I have neither the training nor experience to entitle me to speak with authority, which I do not pretend to do.

The colleges which have come down to us from the fourteenth and fifteenth centuries were all built on much the same plan. A court or quadrangle was enclosed by buildings which contained a chapel, a hall, a library, kitchens, buttery, lodgings for the master or head, rooms for the fellows and their pupils, and an entrance gateway with a porter's lodge. The chapel was of course on the north or on the south side of the quadrangle, and the court was accordingly placed as nearly as possible east and west, and was generally approximately a square. The buildings enclosing the college court were nowhere more than one room in width. Thus the chapel, the hall, the library, all had windows on two of their opposite sides, and this is true also of the principal parts of the kitchen, &c., and of most of the rooms for the master and fellows.

The advantages of the grouping of the various parts of a college round an enclosed court are obvious, providing as it does for security against thieves and undesirable strangers from without, for quiet retirement and seclusion within. Of late years, however, the additions to colleges have rarely taken the form of a completely enclosed court, and it is interesting to consider the reasons for this change in plan. The courts of colleges built in Cambridge before the sixteenth century were all small; they were all more or less rectangular, and their dimensions vary from 70 feet to 150 feet. The buildings enclosing these ancient courts were never more than two floors in height; probably one of the reasons for this was that in no college were there more than a very few fellows, so that there was no need for more rooms than were provided by the arrangement. Whether this was so or not, and whether the same reason was the cause of the limitation in the width of the buildings to one room only, it is certain that these two points, lowness and narrowness, are important points in the question as to the desirability of the plan of an enclosed court.

To the lowness of the buildings is, I believe, in great measure due the beauty and feeling

of rest that seems to pervade these old courts. It is certainly true that there is something oppressive in a small court surrounded by high buildings.

And in a large court it would seem that lowness of the enclosing buildings is in itself a cause of beauty. Let any one stand in the Great Court of Trinity College, Cambridge; he at once feels what a beautiful court it is. And if he considers to what this beauty is due, he will see that it is not to any continuous decoration of the component parts; he will, I think, admit that it is due partly to the great size of the court (it measures about 300 feet by 275 feet), partly to the irregularity of the buildings, but chiefly to the quiet simplicity of the low ranges of college rooms which make up two of its sides, and which modestly permit the greater heights of the gates, of the chapel, and of the hall to assert themselves. In one corner is the modern building containing the Combination Room of three floors with large sash windows; the effect of this building is fortunately lost in the vastness of the surroundings; but let the spectator try to imagine the two ancient sides of the court to be replaced by these so-called improved Georgian buildings, and he will realise how much our ancient courts owe to the fact that their builders were content with a very simple façade and a height of two floors only. The recent example of Keble College, Oxford, illustrates this point. There a court of ample size is enclosed by lofty buildings of three floors, whose height is intensified by the level of the ground in the centre of the court being somewhat lower than at the sides. It will be obvious to an observer how much more beautiful the effect of the whole court would have been if the ranges of rooms could have been kept down to a height of two floors only, so as to allow the lofty heights of the chapel, the hall, and the entrance gateway to have broken up the line of the enclosing buildings.

But there is still another reason for keeping down the height of buildings, at any rate on the south side of a court; in that the higher the building the more sunlight is cut off by it from the interior of the court. It may be for this reason that we generally find the chapel placed on the north side, as being of greater elevation than buildings containing sets of rooms. It is worthy of notice that when Dr. Caius enlarged Gonville Hall by building what is now called Caius Court in our college, he bounded his court on the south side by a wall broken only by the insertion therein of his beautiful Gate of Honour. Not only so, but, in the thirtieth of the new statutes which he gave to the college, he has expressly forbidden the erection of any building which shall completely enclose this court on the south side, "lest the air from being confined within a narrow space should become foul and so do harm to us and still more to Gonville's College."

In contrast to the anxiety of Dr. Caius lest the free admission of sunlight and air into his court should at any time be interfered with, is the action of the trustees of the will of Dr. Whewell, late Master of Trinity, who died about forty years ago. The courts called Whewell Courts, forming an addition to Trinity College, are two small courts, measuring one about 50 feet by 40 feet and the other about 110 feet by 70 feet; they contain only sets of living rooms, and are enclosed on all sides by buildings of three and four floors. It seems strange that those responsible for the erection of these courts should have thought the free circulation of air and the admission of direct sunlight into rooms of so little importance. Quite recently an attempt has been made by greatly enlarging the windows to improve the appearance and lighten the gloominess of these rooms, with no doubt a certain amount of success.

With regard to the planning of the arrangement of hall, chapel, master's lodge, kitchens, &c., it does not seem possible to say much generally, as so much depends on the circumstance of the site and on the requirements of a college.

It may be noticed that the arrangement by which the buildings were in general only one room deep caused the kitchens, &c., to be placed at one end of the hall; an arrangement

which has the advantage of keeping the odours of the cooking to some extent out of the hall. At the kitchen end of the hall it was customary to have a passage going right through the building and cut off from the hall by a screen with a gallery above. In modern times the passage has in many cases become a thoroughfare leading from the old court to newer courts beyond, with the consequent disadvantage that all the kitchen service now passes across the busy thoroughfare. The plan, adopted in several instances in the last century, of building the hall over the kitchen has an obvious advantage in economy of space, but it greatly favours the admission of the air from the kitchen into the hall, a drawback which certainly did not seem serious to Salvin, the architect of the new hall at Caius; for until about ten years ago the windows (which are on both sides of the hall) were arranged to open on one side of the hall only. The advent of the electric fan, however, enables us to a great extent to put an end to this difficulty.

The position of the hall recently built at Girton College is obviously convenient. It is placed at some distance from the students' rooms, and is approached by the students from two directions, through an enclosed passage or cloister opening into the hall on its south side, while the kitchens are placed in a separate building on the north side of the hall. It might perhaps be excusable to remark that the hall of Caius College, being above the kitchen, was provided with an oak boarded floor, instead of the stone or marble floor usual in a ground-floor building; and that this has been found useful (in a way which I fancy was not foreseen by the builders thereof): it makes a capital floor for dancing on the occasion of the annual college ball in the May Term, and is much patronised by Fellows' wives for children's dances.

Now I turn to the arrangement of the ranges of sets of rooms for Master, fellows, and students. In the olden time the Master simply had his one or two rooms in which he lived, a bachelor; as were all inmates of colleges in those days. These rooms were generally between the hall (at the further end of it from the kitchen) and the library. But in modern times the Master of a college requires a good house with all the offices and belongings of a modern residence. So that the lodges of our day are either curious and interesting conglomerations of buildings gradually annexed or added by successive masters, or are brand-new modern mansions built on detached sites in recent times; to criticise them would be to criticise a series of houses built at various periods in the last three centuries.

We come, therefore, to the fellows' and students' rooms.

In the ancient buildings the accommodation provided for each fellow consisted, in general, of one large room. This room was enclosed by its sport-door which opened on to a staircase or passage, and in nearly all cases the depth of the room was the same as that of the building. Thus the rooms were lighted by windows on two opposite sides; the walls were generally panelled with wood; the floor was more or less roughly laid with oak slabs, and there was a large fireplace with a wide and open chimney, and an overhanging mantel above a flat hearthstone. In this one room a fellow or tutor would live with his two or three pupils. There might be in the recess between the chimney and the outer walls, a small study in which the tutor worked by day, but at night the tutor and his pupils all slept in the large room. It should be noticed that these rooms were in some ways admirably adapted for a healthy abode for several inmates. The windows on opposite sides of the room provided means for a through current of air at any time. The fact that two opposite walls were *outside* walls ensured that sunlight should in every case be admitted at some time in the day, no matter what the aspect of the room. In the floors and walls were plenty of chinks and cracks through which air could get into and out of the room; while the chimney was in section many times greater than the modern chimney, measuring, as it often does, only 9 inches by 9 inches. Any one who has lived as I have throughout the year in such a room knows that while it is

not easy to keep it warm when a cold wind is blowing outside, yet it is never stuffy, unless it is crowded by a large number of men.

Thus it will be seen that the plan of the sets of chambers or men's rooms in the ancient building was a very simple matter. The building was merely sliced up by the insertion of stacks of chimneys and wooden partitions, with staircases of one flight at the proper intervals. In colleges at the present day ranges of buildings containing living rooms have to be divided up into sets; each set containing at least one sitting-room, a bedroom, and a pantry, or gyp's room. And when we remember that a very large number of these sets of rooms are required to be as economically and as conveniently arranged as possible, it will be seen that the problem of building additional college rooms is in these days somewhat more complex than formerly.

There are a few points which should be borne in mind with respect to a *set of rooms*. It is usual that each set should be enclosed by a stout door called the oak or sport-door, and it must be remembered that the set is practically a small house or "flat" (without kitchen and other offices), which is the home of its tenant, and ought to be suitable for habitation in health and in sickness. Therefore the following points should, if possible, be observed in all cases. (1) The sitting-room should have some sunlight; (2) the bedroom should have not less than 100 square feet of floor space; it should have plenty of window space that can be opened, and a place for the bed out of the draught; it should have a chimney and other means of ventilation; (3) There should be a possibility of providing for the passage of a current of fresh air through the rooms when the sport-door is closed; and for this purpose the windows of the sitting-room and bedroom should not all face the same way.

This last requirement seems to be of very great importance, and it is one which is apt to be overlooked. As has been said, a set of rooms should be regarded as a separate house; it therefore ought to satisfy all the reasonable requirements of a house. In all building bye-laws of recent times great stress is laid upon the provision of air space both in the front and in the back of a domestic building; and for a very good reason. In order to change the air in a room quickly and effectually it is necessary that a through current of air should be set up in it. Of course if a fire is burning in a room, the chimney is a mechanical means of ventilation, and acts as a suction pump, taking out of a room a considerable quantity of air per minute, and consequently causing an equal quantity of different air to enter. This air enters from the windows, the door, the cracks in the floor boards, and through the walls; and if the air coming in is fresh the fire will mechanically keep the room well ventilated. It might be worth while to note here that we have the authority of Dr. Shaw, F.R.S., Director of the Meteorological Office, for the statement that a fire in an ordinary grate is a mechanical means of ventilation sufficient, roughly speaking, for *four* persons. But as in this country we do not keep fires burning all the year round, and we do not as yet, in ordinary circumstances, provide any other mechanical means of ventilation, the possibility of ventilating a house simply by the movement of the outside air becomes of vital importance. If we have a window open in a room and there is no other opening in the room, such as a chimney or an open door, the wind, even if blowing outside directly at that window, will cause very little air to enter that room. A certain amount of disturbance will be set up in the air in the room (of the nature of a vortex motion) in the immediate neighbourhood of the window, but very little *change* will take place in the air in the room. That is to say a single open window, and no other opening, is not an efficient means of ventilation. If there is a chimney in the room with an up or a down draught it will improve matters considerably; but to ventilate by one open window only is like trying to get circulation, in a room crowded with guests at an "at home," through one solitary door. There is no circulation, only disturbance.

It seems, then, to be of great importance that every set of rooms should be provided with

adequate means for summer ventilation by arranging that the windows of sitting-room and bedroom should not *all look the same way*; for it is then possible by opening windows looking to different points of the compass to set up a through draught.

I proceed now to consider how the points which I have laid down as desirable in a set of rooms can best be obtained, regard being had to economy of space and the convenience of service.

Economy of space in nearly all cases demands that we shall have buildings of three floors and an attic, and the colleges nearly always ask that at least eight sets of rooms shall be provided on each staircase. One reason for this (besides economy of space) is that for convenience of service it is an advantage to have them so arranged, because a scout or bedmaker can attend to at least eight sets.

The question therefore arises, why not put four sets of rooms on each floor approached by one staircase? This would give, with two floors and an attic, either ten or twelve rooms to each staircase, and would economise frontage space. This arrangement, if a plan could be devised free from objections, would have many obvious advantages. It would seem, however, that this is not very easy.

I know of only one instance in Oxford or Cambridge in which the arrangement of four sets of rooms on a floor has been adopted. I give a rough diagram of the plan. In it A_1, A_2, A_3, A_4 are the sitting-rooms; B_1, B_2, B_3, B_4 the bedrooms; D is the scout's hole or gyp-room. The plan is open to the following objections: (1) It will be seen that when the sport-doors leading to the lobby, E , are shut, there is no possibility of a through ventilation of any one of the four sets of rooms, except through one of the others; (2) c_1, c_2, c_3, c_4 are passages which are without direct light or ventilation; (3) the lobby, E , is badly lighted and badly ventilated. The particular building in question faces east and west, so that both the sitting-room and bedroom in each set gets some sun; it is obvious that if the buildings faced north and south, the north sets would have practically no sunlight in either room.

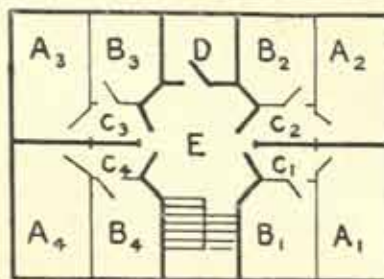


FIG. 1.

Of these objections none are, I think, fatally serious except the first. No house, probably no flat (but I am not familiar with the byelaws concerning flats), would now be allowed by any byelaws to be built back to back with another house, and therefore I think that no set of college rooms should be allowed to be so built. So far as I know, no other solution of this problem has been suggested, and it may therefore be said to be best to have only two sets of rooms on a floor on each staircase. It follows from this that, in general, the sitting-room and bedroom windows will look in opposite directions and our building will have a front and a back, if we agree and call the *front* the elevation in which are the sitting-room windows. (It will be remembered that in ancient college buildings the living rooms had windows on two opposite sides, so that in those days there was no front and no back to the buildings.)

Can we now give any answer to the question, What is the best typical arrangement of sets of college rooms? A great deal must, of course, depend on the site available, and a great deal on the aspect of that site. If we accept the rule that sitting-rooms must look into the "court," or what takes the place of a court, and are agreed that a sitting-room should have sunlight at some time in the day, it will follow that a range of college rooms must not be placed on the south side of a "court."

This result, although here arrived at for quite different reasons, fortunately agrees with the statute of Dr. Caius, viz. that a "court" should be open on the south.

After a careful comparison of plans which have been adopted in recent times at both Oxford and Cambridge, it seems to me that the plan recently adopted, quite independently, by Mr. Champneys at New College, Oxford, and by Messrs. Aston Webb and Ingress Bell at Gonville and Caius College, Cambridge, is one of the best.

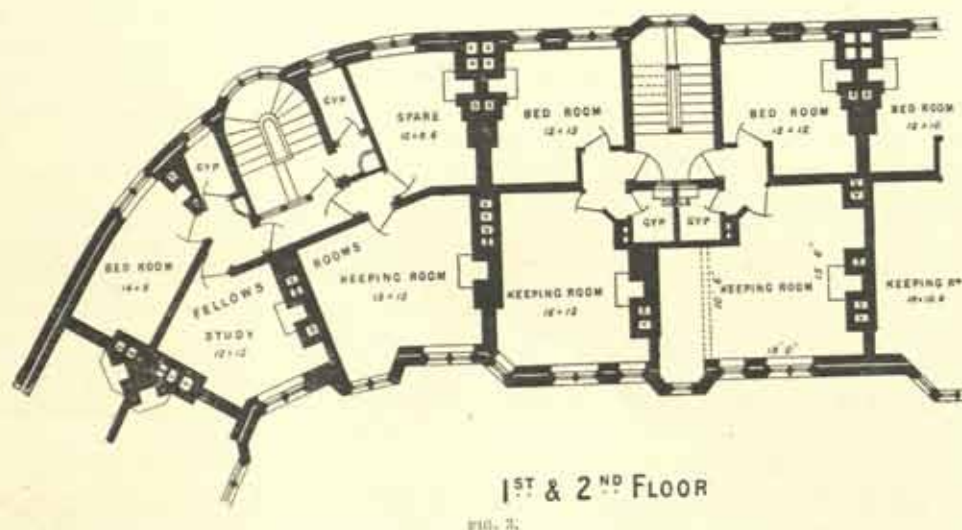
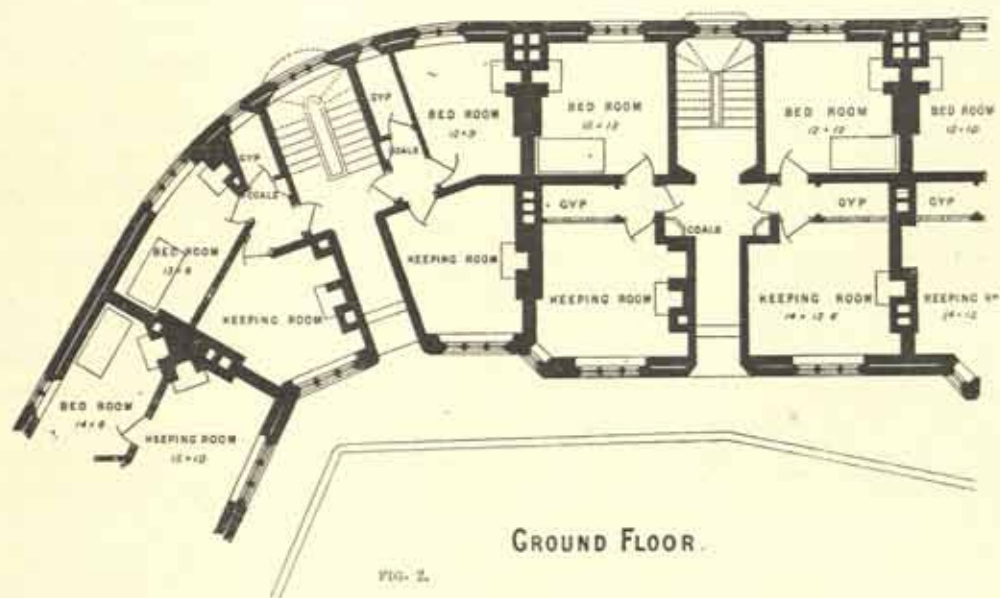
The arrangement is here shown in figs. 2 and 3, giving a portion of the plans of St. Michael's court. This building faces south-west towards a narrow court. The staircase is on the north-east, and is approached from the court through a passage about four feet wide. On the ground floor on each side of this passage is a set of rooms, of which the keeping rooms face south-west, the bedrooms north-east; the gyp-rooms also face north-east (a good aspect for a pantry). Again, when the sport-doors are shut, the opening of a window in sitting-room and bedroom, one on each side of the building, gives excellent ventilation; so that these rooms satisfy the hygienic conditions already laid down. The staircase is thoroughly well ventilated; with a window open on the staircase, air can blow right through the building from the entrance passage to this window. On the first floor, as the space over the entrance passage is available, we have the whole frontage to the south at our disposal for division between the two sitting-rooms. In the plan adopted at Caius College the space over this passage is all thrown into one room, making the rooms on each side of unequal size; at New College, Oxford, this space is divided equally between the two sitting-rooms.

In fig. No. 4 is shown the arrangement adopted in the Tree Court at Caius College in the new buildings by Mr. Waterhouse, R.A., in 1870. Fig. 5 shows the same space arranged in accordance with Messrs. Aston Webb and Bell's plan in order that a comparison of the two may show their respective advantages. One objection to No. 4 is that the gyp-room opens directly on to the staircase landing and is not included within the sport-door. This was done in 1870 after careful consideration, and for the reason that it was originally proposed to provide in each gyp-room a *sink* and waste for the use of the bedmaker. If this had been done it would have been obviously undesirable to put the gyp-room *within* the set of rooms, as there would then have been a direct communication with the drains close to the bedroom. It was subsequently decided not to provide a waste in the gyp-rooms, and by a slight alteration these rooms could have been included within the sport-door, an alteration which will probably some day be made. A more important objection is that the staircase has no independent *through* ventilation. This, again, is not a very vital objection. But the great advantage of Plan No. 5 over Plan No. 4 is that the first gives the whole of the front above the ground floor to the sitting-rooms, thus giving an opportunity of opening additional windows, and therefore providing additional sunlight and air for those rooms.

The rule that a court set aside for sets of rooms only should have no buildings on its south side has been very generally observed in recent additions to colleges in Oxford and Cambridge, so that these additions have usually taken the form of a straight line, or of an L, or of a U. Now, assuming that it is wished that no sitting-room should face north, it is clear that a difficulty arises in the *angles* of the U and of the L; and this brings me to another point on which I should like to say something.

It will be obvious to those examining the new buildings in Oxford and Cambridge that when the general plan of a building has been settled, it has been the custom in planning out the allotted space into sets of rooms to practically choose a certain arrangement and then *repeat* that arrangement on each staircase. It happened in the recent work at Caius College that a certain irregular site, covered by a row of houses of different sizes, had to be replaced (after pulling down the houses) by a college building containing sets of rooms, and it was

essential that practically the same cubic space should be occupied by the rooms as was then occupied by the houses. The irregularity of the site was such that uniformity of plan could only be attained by sacrifice of space. The college had therefore to determine how far irregularity of plan was objectionable. They had had experience of uniformity of plan in the



ST. MICHAEL'S COURT, DONVILLE AND CAIRNS COLLEGE, CAMBRIDGE.

Waterhouse building in 1870, and after careful consideration they decided that in their opinion irregularity of plan was desirable rather than otherwise, and the architects were instructed to give as much variety in the size and shape (within certain limits) of the rooms as they conveniently could. Probably in this we are only following the fashion of the day; for in the plans which one sees nowadays of many country houses and town mansions, one cannot

help being struck by the irregularity of the plans, and by the variety of the size and shape of the rooms. The result in our new court at Caius is that hardly two sets of rooms, out of fifty, are exactly alike.

The irregular site of St. Michael's Court is practically an L with an angle at the corner of about 120° . And it is the solution adopted by our architects of the problem of how to deal with the corner that seems to me instructive. The plan which I have advocated for a straight building is still kept, but the rooms, particularly the sitting-rooms, take a very unusual shape. The arrangement is shown in figs. 2 and 3.

Here, then, seems a solution of the difficulty of how to deal with a corner of an L or a U which, provided you do not exact the condition that all rooms shall be rectangular, avoids many objections. In order to illustrate the advantages of the arrangement, I have adapted it to the first floor of the building in the corner of the Tree Court of Caius College, in order that we may compare it with the existing arrangement. The two arrangements are shown in figs. 4 and 5. The new plan [fig. 5] gives two sets of rooms, with sitting-rooms, each facing S.W., of very irregular shapes. The shape, however, seems to me to be not uncomfortable. It provides an ample staircase well ventilated, with good space for bedroom and gyp-room. The existing plan [fig. 4] provides two sets of rooms which in size and shape are excellent, but one set has all its windows looking north. And as the building looks on to a narrow lane with high buildings on the opposite side, the rooms, notwithstanding their good size and shape, are not popular. The corresponding rooms on the ground floor are practically unsuitable for habitation, and are used as offices. The other set of rooms has windows all of which look in only one direction—viz. east; and they therefore transgress the rule laid down above. Fortunately, the street on this side is wider, and there is an opening in the opposite side of the street, so that these rooms do get a certain amount of sunlight.

In comparing these two plans it must be remembered that with a clear site a considerable amount of modification could be introduced in the proposed corner arrangement; but from our experience with the irregular rooms in St. Michael's Court, it would seem that mere irregularity of shape is no detriment to a college room. The important points are: Is it comfortable? Has it sunlight? Is it airy?

The points which I have ventured to attempt to emphasise in the planning of college rooms are in the main three: (1) the desirability of having some sunlight in the sitting-room in all cases; (2) the importance of it being possible to set up a through current of air through every set of rooms independently of the staircase; (3) the desirability of having a through current of air through the staircase itself. And I have given a plan of sets of rooms which provide all these advantages in rooms facing south or east or west.

It is also suggested that the plan of an enclosed court is not suitable when the enclosing buildings are lofty, and if a court must be enclosed on the south, it would serve best that the hall or chapel or master's lodge, or any building other than one occupied by sets of rooms, should occupy the south side.

The point which is here raised, as to the desirability of having windows in living rooms on more than one side, applies with equal or greater force to all rooms intended to be used as chapels, halls, lecture-rooms, laboratories, or class-rooms. It would seem that unless such rooms are provided with an efficient system of mechanical ventilation in summer as well as in winter they should never be built without windows, or at least openings to the outer air on two opposite walls.

Finally, I would venture to plead with Architects not to grudge a large share of attention to the use to which a proposed building is to be put. While the Universities of Oxford and Cambridge owe a great debt to great Architects of the past century and of the present day,

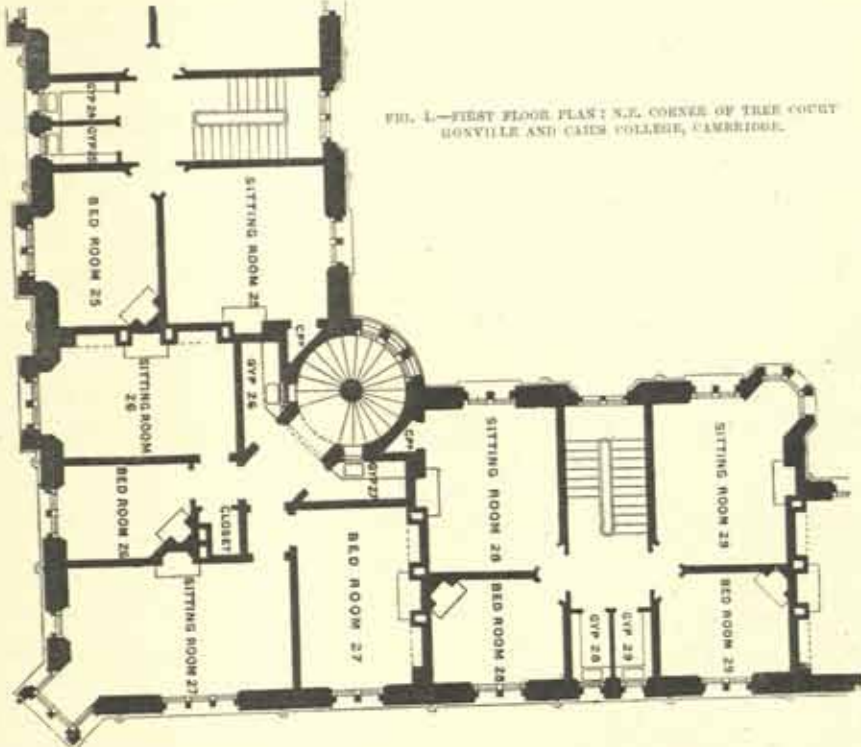


FIG. 4.—FIRST FLOOR PLAN: S.E. CORNER OF TREE COURT
HONVILLE AND CAIRN COLLEGE, CAMBRIDGE.

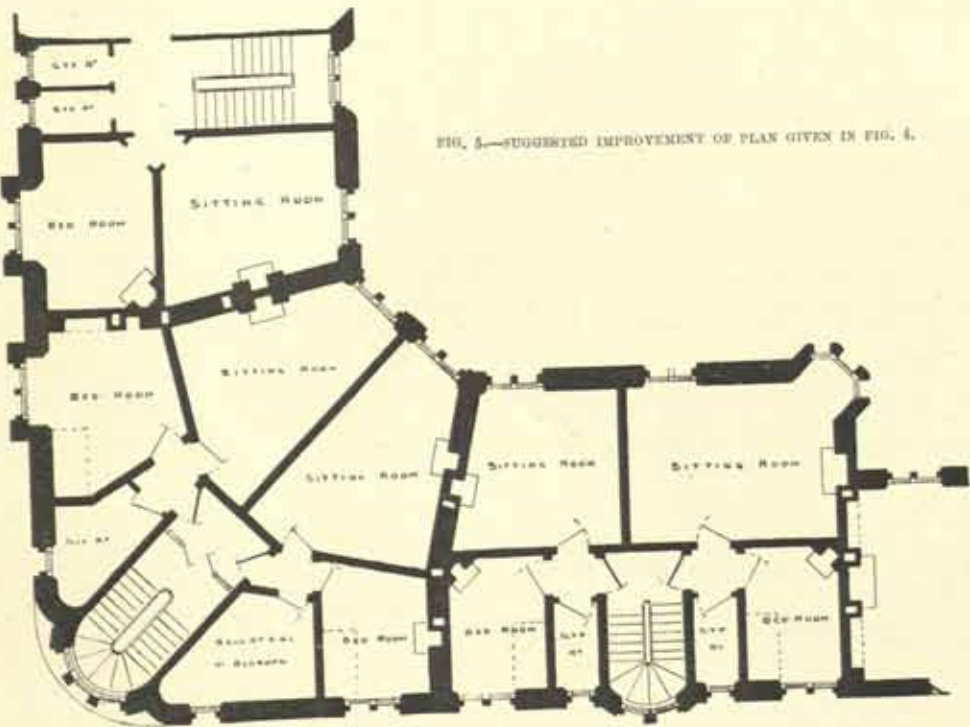


FIG. 5.—SUGGESTED IMPROVEMENT OF PLAN GIVEN IN FIG. 4.



8 H
Pics!

yet we have to lament many mistakes. Whether these mistakes were due in any particular case to the Architect, or to the committee entrusted with the duty of instructing the Architect, it is often not possible to say. But when we find an addition to a library with a very artistic and effective elevation, in which the windows are far too small for their purpose, and the ground-floor rooms are actually unfit for use on account of their dampness; when we see college rooms, with the sitting-rooms looking north, on a dusty and noisy street, instead of south, into a quiet and sunny court, presumably because the elevation towards the street suited that arrangement; when we have an ornamental building put up for the use of University Press, with windows so small that the building is practically useless; when we hear of a series of lecture rooms of costly and elaborate design so wanting in effective means of ventilation that they are described by those condemned to use them as *pestilential*; I think we may fairly appeal to Architects to first consider carefully the use to which a building is to be put before they design their façade. I fancy I remember seeing a report of a speech by your President in which he advised Architects not to put *all* they knew into a façade; I would ask them to spare a *large share* of their genius and experience for the planning of the building. Surely the chief beauty of a building is that which arises out of its perfect adaptation to the uses for which it is designed; and often difficulties of site or arrangement suggest variety in treatment of the exterior which, springing as it does from the requirements of the plan, is a source of pleasure to all who are familiar with the convenience provided.

"A thing of beauty is a joy for ever." But how can a building which is unsuitable for its purpose be a source of joy to those who have to use it? How can a college building which is not healthy and pleasant to live in be a source of satisfaction to the members of the college, even if the façade is in itself greatly admired? Is it not possible that the taste of the next generation may condemn that very façade? and where then will be the beauty of the building? Whereas a building eminently suited for its purpose must *ipso facto* be superior to the influences of time and taste; it has in itself the essence of beauty; it is a source of satisfaction to all who use it. A building, to be a thing of real beauty, must be a joy, not only to the passer-by, but to those whose lives are spent within its walls.

DISCUSSION.

The President, Mr. ASTON WEBB, R.A., F.S.A., in the Chair.

MR. BASIL CHAMPNEYS, who rose at the invitation of the President, said it was but a short time since he had delivered himself on the same subject in that room.* He would, however, make a few remarks that had occurred to him during the reading of Mr. Lock's very excellent and practical Paper. Of course the author had dwelt more upon the practical than upon the historical. The whole system of college rooms was absolutely transformed in the sixteenth and seventeenth centuries. The old plan was that there should be one large room where a

Master of Arts and students slept together, and adjoining this, generally opening out of it, were two small studies. Many of these survive in the old buildings at New College. When that was the case a very small college would accommodate a great many students, and supposing that one of these sets took one master and possibly half-a-dozen students, there would be, for the same building, accommodation for six times as many as when the time came for each student to have a separate pair of rooms. The adaptation usually was that the large room was taken to be the undergraduate's sitting-room, one of the small studies was taken to be his bedroom, and the other served for the gyp-room. There were numbers of college buildings surviving in Oxford in

* "The Planning of Collegiate Buildings," by Basil Champneys, B.A.; JOURNAL R.I.B.A., Third Series, Vol. X., p. 205.

which the old partitions remain exactly as they were at the time they were built in the fourteenth or fifteenth century; it was simply the uses of the rooms that had been altered. That, of course, affected both the question of height and of size. In the old days, when the accommodation was put to so much larger purposes, they did not want to build upwards, and two floors were probably enough. In the later buildings for the most part were two floors and an attic. If the promoters of the present day—as he understood Mr. Lock to say—required three floors and an attic he very much regretted it. He had rarely seen three floors and an attic which had not looked to him altogether too high for collegiate purposes. He had so far been fortunate in persuading his clients never to go beyond the two floors and an attic, and he hoped in the future he might be equally successful. He had dwelt on that point in his last Paper, and mentioned two or three buildings which did not satisfy him from the æsthetic side; and of course there was this practical side, that college servants felt the wear and tear of the stairs very considerably. Only the other day, the Bursar of one of the colleges for whom he prepared certain plans, impressed upon him the necessity of making the stairs not only easy in themselves, but taking off the wear and tear by putting down lead or something of that kind, because the servants were constantly complaining of the staircase. With regard to the size of quadrangles, he heartily agreed with Mr. Lock that if they could possibly leave the south side open, closed by a railing, or what not, it was an enormous advantage to the whole building. They could not always secure that the sitting-rooms in a college should have a south aspect, but wherever it was possible it ought to be done. He thoroughly agreed with the idea of through ventilation where it could be obtained, and this involved the moot point whether there should be a door from the sitting-room to the bedroom; and, of course, settled the point in favour of the door. With regard to the Masters' Court at Trinity College, Cambridge, he felt with Mr. Lock that the size of the quadrangle was absolutely insufficient. He was one of the first occupants of a set of these rooms when they were built, but fortunately he happened on rooms which looked out into All Saints' Passage, and so got plenty of light and air; but some of his friends, who looked into the quadrangle, had since met with various unhappy fates. Whether it was due to the smallness of the quadrangle or not he could not say. However, he had an airy and well-lit room and had survived. Some very curious and interesting things had come to light about the kind of way in which college rooms were used by the masters of the colleges. He had lately had an instance of a warden of the last century who used, whenever the Fellows went down for the Long Vacation, to

burrow into their rooms, and when they came back they found no rooms to receive them: they had been absorbed into the master's lodge. Nearly a whole side of the quadrangle had been so incorporated, and the poor Fellows were left to whistle for their accommodation. A question of considerable importance, which Mr. Lock had only touched upon indirectly, was whether fireplaces should be considered to be a necessity in bedrooms. He, personally, had no great belief in the ventilating power of fireplaces when there were no fires in them. They were as apt to work downwards as upwards, and when they worked downwards they introduced a sooty sort of atmosphere into the room, which was apt to do rather more harm than good. In his experience the fireplaces in the college bedrooms had very rarely been used. Nowadays they were not so dependent on windows as they used to be; they had various means of obtaining ventilation which were not known to their ancestors; Tobin ventilators had great advantages, and were exceedingly useful things to introduce into rooms. There was a rather larger question he wanted to mention as a possible new departure. In the first place, as to gyp-rooms, as they called them at Cambridge, or scouts' holes, as they were called at Oxford: it had been the tendency lately at Oxford to make one fair-sized room answer for a whole staircase. It had been found very useful to have a somewhat large gyp-room or scout's hole containing a gas, or some other, stove, so that they could get hot water at any time without having to oppress themselves with a fire. As to coal-stores, if they were planning rather close, and had not many spare spaces, it was a little difficult to get stowage for each undergraduate's coal. Of course, there were various ways of meeting that—each man could have his little coal store in the basement, and the servant could bring it up; but that meant a good deal of labour, and it would be better to get the man who brought in the coal to put it where it would be handy. Speaking in the presence of a Bursar, he spoke with great diffidence; but it might probably be that in many colleges there would be a regular rate chargeable for coals, that there would be a common store, and that it would not be necessary to assign to every man his exact little quantity of coals. On the whole he was inclined to think that the individual coal-bins, or at any rate the individual supply of coals to each undergraduate, might be simplified. Baths he found were more and more needed. It would, he thought, be easy to supply, for a set of college rooms with so many staircases together, a number of baths which might be used by roster, or in some other way. They would be a most desirable adjunct. The principal point of all was the staircase arrangement. He had lately had to meet the problem of getting the largest possible number of rooms into a very limited space, and he found that he could get this far

better by making the staircase external to the main block, and of the spiral type. Looking at the plans on the walls it would be seen that, to use an American phrase, the staircase cut a big chunk out of the building. If it could be projected, the opportunity would be afforded of a picturesque feature, and, in addition, the general parallelogram of the building would be relieved of any diminution by the staircase. He had not done this yet; he was going to do it for the first time, and perhaps a year or two hence he would be able to tell better how it worked out, and how it suited in actual use. He found that with a very limited space he was able to save on one side of an open quadrangle 11 feet and on the other side 22 feet by adopting this plan, and as the space was excessively valuable, it seemed that there were at least advantages in it. Whether where there was ample space and money this was the better method he was not prepared to say, but he did not see at present that there were any necessary disadvantages attending the plan. However, he spoke as a person about to embark on an experiment, and with the diffidence which was becoming to people in such a position.

Mr. EDWARD S. PRIOR, M.A., expressed the extreme pleasure it had been to him to come to the meeting, and for many reasons. First, Mr. Lock was an old friend of his, and it was always a pleasure to hear him speak; secondly, it was always a pleasure to hear an expert speak upon a subject he knew thoroughly. Mr. Lock had been managing a college for some considerable number of years, and knew exactly what a college was, what a college needed, and what a college was used for. That led him to mention the third reason of his pleasure, which was probably that of all of them—viz. that they as architects had heard that evening a lay speaker, somebody outside their own particular view. It was not only healthy, but, with regard to architecture, it was very necessary for them every now and then to consider that there was another view outside their own as architects. He remembered at the Congress of Architects held some years ago the subject under discussion drifted into the function of architects, and a speaker eloquently, and at great length, put forward how the architect was the all and everything; he was the beginning and end of practically every function of modern life. He thought at the time that that was going a trifle beyond what was the case; in fact it seemed to him that after all the other side was perhaps rather truer, that the user was the all in all, and that the architect came in as a subsidiary to the user—that he, in fact, determined rather the way in which the thing was to be done than what was to be done; he contributed the imagination necessary to put the user's intelligence to the purpose for which it was intended. Mr. Lock had well rubbed that into them. As regards the history of the matter, he supposed

the earliest collegiate buildings in the British Isles were the collection of hermits' cells, which consisted of a bell-shaped chamber with a seat on one side, in which the occupant passed his days sitting in the sun. From that collection of hermits' cells the building of colleges had gone on, step by step, until they came to their present position. The Middle Ages went a long way in the Chartreux. At Mount Grace considerable progress had been made towards a very excellent collegiate building. The fifteenth, sixteenth, seventeenth, and eighteenth centuries had all developed it, while now at the end of the nineteenth the collegiate building was shifting its ground and was really becoming a collection of flats. There were two or three tendencies in that direction which Mr. Lock had brought out; in the first place he had shown us quite truly that the enclosed court was no longer the best for a college building, but that one side of it should be open towards the south. Thus practically they were getting into the planning of flats. Another evolution Mr. Champneys had mentioned, that of the common gyp-room with a stove in it. This was a drifting away from the collegiate arrangement of old times; they were reaching a new era. What he wanted to observe was that if that were so, if the college was necessarily drifting into something else, why should they go back to any time, however picturesque, just to take the style of that time and call it "collegiate"? To do this was of necessity to make their new college buildings in forms which no longer fitted their requirements. In modern college buildings there was always this great difference from the old: the old had a certain space about it, there was a certain distance between its windows, and a certain breadth of wall; the new, having to meet new requirements, if it still aped those windows and tried to produce the effects of style, made a mess of it with different proportions and different sizes. The older collegiate styles were no longer of use in college buildings; the buildings should be erected in the forms that grew from the uses to which they were to be devoted.

THE SECRETARY (Mr. W. J. LOCKE, B.A.Cantab.), referring to the common gyp-room, asked the author of the Paper how the bedmaker managed to separate the effects of the men on her landing or staircase. His rooms at Cambridge were arranged in this way: you entered from the oak into the sitting-room, which led into the bedroom, and that again into the gyp-room. His gyp-room he used as a bath-room, and he used the gyp-room of another man on the same landing which opened immediately on to his oak. Consequently their butter, cheese, eggs, beer, coals, and wood were all mixed inextricably; one never knew which was his and which was the other man's, and the bedmaker could not tell either.

THE REV. J. B. LOCK, replying to the Secretary, said that when they were planning St. Michael's Court, he went to Oxford for the purpose of going over the new buildings erected there in the last fifty years. In Mr. Bodley's beautiful building at Magdalen, he met a scout on the staircase taking from some rooms a tray of things down to his room below. He asked the scout if he would prefer to have a sink and wash-up place on each landing, or whether he preferred to take everything down to his own room? The scout replied that he much preferred to take them down to his own room. The result of this hint and of further enquiries was that in St. Michael's Court, which was a building of five floors, there was at the bottom of the staircase a little room in which there was a sink and a range, so that the bed-maker had a fire all the year round—a great advantage, they thought, for her health. In addition to this, in each set of rooms there was a gyp-room or small pantry which was intended as a storage place for the various provisions and beverages which the undergraduate liked to keep to himself. Mr. Champneys' remarks showed that he had thought a good deal about the minor details connected with the planning of college rooms. He spoke of the hard work it was for the bedmaker to go upstairs. The architects of St. Michael's Court suggested that they should have wooden treads to their stairs, as quiet and comfortable in use; the bedmakers thoroughly appreciated the advantage of not having to go up and down stone stairs. As they were going into details, he might mention that the bedmakers no longer had to carry their water up and down stairs; the water was provided by taps upstairs, and there was a waste on the staircase—he need not say, properly arranged. With regard to the doors between the bedrooms and sitting-rooms, from his point of view they were not necessary for ventilation because the two doors from sitting-room and bedroom into the lobby were so close together. Moreover, in order to secure a free circulation of air, they had in all cases put an opening with a hit-or-miss shutter over both these doors; the hit-or-miss was generally fixed open, which was the best way. Besides this they had in the bedrooms a separate ventilator, a ventilating flue carried to the top of the building, from which there was an opening into every bedroom near the ceiling. The fireplaces, which were seldom used, provided an opening near the floor; thus there was an opening at the floor and at the ceiling in every bedroom. The architects planned originally to have a hit-or-miss in those openings in the bedrooms, but he took the responsibility of leaving them out, as there seemed to be no circumstance under which they ought to be closed. That arrangement of ventilator and fireplace seemed to be good, because there circulation of air would easily be set up in a room with openings at the

ceiling and at the floor. They had solved the problem of coals with great care. The architects had planned an extremely ingenious arrangement. There was an ornamental oak front in the staircase, and in it there was a ledge of the ordinary kind meant for parcels; the shelf of the ledge opened and disclosed a coal-box into which two hundredweight of coal could be put; a man had only to open the door of his gyp-room and he found his coals ready to hand. The problem was to find the least size of the coal-box in which the coals would always fall down to the floor without jamming; the clerk of works had had five different coal-boxes made before he hit on the right size. This arrangement avoided the necessity of the bed-maker carrying the coals upstairs, and had besides other advantages. The question of baths was a very pressing one. In St. Michael's Court they had arranged a place for them in the basement, and there was a committee just appointed to consider how they should be carried out. The solution, he thought, would be to have two or three shower-baths with dressing-rooms, as they had in the public schools.

MR. A. W. S. CROSS, M.A. Cantab. [F.], said he rose with considerable pleasure to propose a hearty vote of thanks to Mr. Lock for the very able and practical Paper he had been kind enough to give them. Most of them would remember Mr. Cecil Rhodes's description of college dons, a description based, presumably, on Mr. Rhodes's experience of the dons at his own University; but gentlemen in that room who had had dealings with the University authorities at Cambridge knew well that the characteristics to which Mr. Rhodes referred could not justly be applied to the large majority of members of the governing body of Cambridge University. In their visitor of the evening they were honoured by the presence not only of a scholar, and the author of a series of educational mathematical works which had materially assisted to lighten the burden of many an unfortunate undergraduate in his struggles with the inevitable and to him highly unnecessary examinations, which in many cases embittered his University career, but they had also the pleasure of meeting a gentleman to whom the members of his own college were under a great debt of gratitude for the very able and successful manner in which he had administered its finances for so many years past. In other words Mr. Lock, in addition to his varied accomplishments, was an excellent man of business. He had, too, shown them that evening that had he directed his attention to architecture he could scarcely have failed to attain high rank in one or more of its branches. He recently had the pleasure, under Mr. Lock's guidance, of inspecting the beautiful new buildings with which the President had enriched the ancient University and town of Cambridge, and the keen interest which Mr. Lock evinced in every

detail of the internal arrangements of the structure made one wish that the general public would take a similar keen interest in and show as great an appreciation of the architect's labour and thought.

Mr. H. G. IBBERSON [F.], in seconding the vote of thanks, said that over the entrance gateway to the building in Rose Crescent, Cambridge, which had been referred to, there was some exceedingly beautiful carving, and in that carving were the figures of two little nude boys. He believed there was some discussion at Cambridge as to whom those little boys represented, and the final opinion was that they represented Dr. Gonville and Dr. Caius as "children in finance," a reference, of course, to the remarks by Mr. Rhodes *à propos* of University authorities in their business relations. He felt with the last speaker that they had a University professor with them that evening whose practical side had been shown, not only in finance as a college bursar, but also in building. But one had also a glimpse during his remarks of an artistic as well as a practical side, although repressed, and possibly not acknowledged: in dealing with those old courts there were certain references to the low reposefulness of the buildings which, although slight, were very feeling. That led him to make one reference to a suggestion that staircases should project into the court rather than be placed in the building. It occurred to him that such an arrangement would disturb the repose of the façade, and make the circulation of air in the court less satisfactory.

THE PRESIDENT said they had had a most instructive evening, and were very much indebted to Mr. Lock. Mr. T. G. Jackson, who had had so much experience of buildings of this class, had written to say that he should have liked to be present, but, as many of them knew, he had been ill; and though he was now better he was not yet able to come out at night. They all appeared to agree with Mr. Lock that the heights of buildings round courts should not exceed two stories and an attic. He could only regret that in the particular case with which Mr. Lock was concerned he fixed the height at three floors and an attic. That only showed the difficulty of carrying out in practice the principles one held in theory. With regard to another point of Mr. Lock's, the quadrangle surrounded on three sides and open on the south, he ventured to think that even that was not quite sufficient to secure the through draught which he very properly was anxious to secure. As he pointed out, if there was a window only at one end of the staircase, one would not get a through draught; and so, with a considerable quad open only on the south, one could not get a draught through it. In the Isle of Wight, in a very exposed position, he knew a sort of summer-house enclosed on three sides, in which one might sit facing the wind and not feel the wind at all. The space in which one sat was so full of air that the wind could not

disturb it. There was, too, the well-known example of driving in a hansom cab where, if there is much wind, the doors would often fly open from the pressure exerted by the air in the cab. The only way to get cross-ventilation through the quad is to have the angles open also, and thus avoid the difficult angles which Mr. Lock had pointed out. A well-known example of that was the quad of St. Bartholomew's Hospital, Smithfield, which had remained for a great many years longer than it would have done if the angles had not been open, and so although the wards of St. Bartholomew's Hospital were side by side, and back to back, still the circulation through the quad had been secured by the open angles, and health had been maintained under it. As to the gyp-rooms, unfortunately neither Mr. Bell nor himself had the advantage of being University men, and they had to some extent to find these things out. They were rather surprised when they came to close quarters with it to find that, although there were gyp-rooms, the gyms had practically been given up—at any rate in Cambridge; he believed now they were called "bedders." For these bedders (there was one to a staircase apparently) one good room down below, with a little pantry attached to each floor, seemed to be the best arrangement at the present time. As to the aspect, every one would agree that a single room in which a young man had to live a good many hours a day ought to have some sun in it. Pembroke College, those very beautiful buildings by Sir Gilbert Scott, he happened to know very well. Its sitting-rooms faced a road and faced the north, and that was the only thing in those beautiful buildings one had to find fault with. On the staircase it seemed all bright and sunny, but entering the room one experienced a cold, depressed feeling directly. With regard to the details of gyp-rooms, coal-boxes, and so on, all these ingenious contrivances were absolutely Mr. Lock's, and if everybody had his due, certainly Mr. Lock's name should be on that plan as well as the architect's. He settled the general disposition of the rooms, and all the other details. He (the President) entirely agreed with Mr. Prior that the architect's business was not entirely to override his client, but to work with him. All reasonable architects were only too glad to get the suggestions of those who were going to use the buildings, and who must very often know their requirements better than the architects did. In this case Mr. Lock suggested the greater portion of these arrangements, and the part he was responsible for turned out extremely well. There were other details he wished he had gone a little further into. At a modern college there ought to be baths. He thought so then, and had impressed it upon the authorities, and he was glad to hear there would be baths later on. He also thought hot-water should be laid on to each floor. Why it should

still be cooked in kettles to the great danger of the undergraduates and the buildings generally he could not conceive. There were also certain sanitary annexes which he did not think should be absolutely abolished from even University buildings. There was one point touched on in the Paper he should like to say a word about. Mr. Lock in his concluding observations was rather severe on architects when he begged them not to think only of the outside of the buildings, and he ascribed to him (the President) a remark counselling architects not to put *all* they knew into the facade. He no doubt said such a thing, but he did not remember making that remark. It was, however, a curious thing that the public should still

think that architects thought only of the front, and took no trouble about the inside at all. The peculiar thing was that most architects would say that the tendency of architects at the present day was to think a little too much of the inside and less of the front. He was quite sure that the development of plan in these days has grown more rapidly than the development of character in the architectural work they were carrying out. He hoped Mr. Lock would take it from them that architects did think of the inside, and that they quite agreed with him that a building to be worthy must be fitted for the purposes for which it was to be used. They were greatly indebted to Mr. Lock for his Paper.



9, CONDUIT STREET, LONDON, W., 21st May 1904.

CHRONICLE.

Board of Architectural Education.

The Council have appointed a Committee that will be constituted as a Board of Education, to whom it shall be a reference, with a view to the consideration of the various schemes of Architectural Education throughout the United Kingdom, to draw up and submit to the Council a uniform scheme of Architectural Education, and to approach the recognised institutions of architectural training with a view to its general adoption.

The Board is to have full power to conduct its own negotiations for the purposes of the above Report, but shall not, without special Resolution of the Council, involve the Institute in any expenditure. The Board is composed of *Members* and *Advisory Members*.

The *Members* are 16 representative architects, of whom at least 10 are to be members of the Institute. Of these architects three are to be selected by the Council, and are to include its President. Two (being members of the Institute) are to be selected by the Committee of the Architectural Association, and are to include its President. The remaining 11 are to be appointed in the first place by the Council and afterwards co-opted by the Board.

The *Advisory Members* are to be representatives of the Royal Academy, University of London, University College, King's College, the Board of Education, the Architectural Schools of Liverpool and Manchester Universities, and of Leeds, Birmingham, Edinburgh, Dublin, Cardiff, and of such others as may afterwards be determined by the Board.

Board of Professional Defence.

The President, at the General Meeting last Monday, announced that the Council, after very careful consideration, and after the matter had been reported upon by a Committee, had decided to establish a Board of Professional Defence. The work of the Board would be to consider any case submitted to it by a member of the Institute, and report to the Council whether it would be in the interests of the profession generally for the Institute to support the member. The Board would have authority from the Council to take solicitor's or counsel's opinion on any case to enable it to report. In France, continued the President, architects had long possessed such a Board, and it was considered that architects in this country should have something of the same kind. The Council had only decided the matter that afternoon, and in due course there would appear in the *JOURNAL* particulars of the formation of the Committee, and the conditions under which members of the Institute would be able to apply to it for legal assistance.

The Registration Question.

The following letters have been handed in for publication:—

64, Cross Street, Manchester, 4th May 1904.

W. J. Locke, Esq.—

DEAR SIR,—I have recently received a letter from Mr. W. Gillbee Scott, of 25, Bedford Row, London, respecting the R.I.B.A. Election.

His letter asked if I was in favour of the

Registration and Statutory Qualification of Architects, and asked me if I desired to have my name included upon a certain list of candidates for election, would I sign an enclosed form. I have not signed the form, because I think such action as they are proposing to take does not agree with my ideas of what should be done. I dictated a letter to Mr. Scott, copy of which I enclose herewith. I send this to you so that my position in the matter may be quite clear. I decline to sign Mr. Gillbee Scott's circular whether the result is that I remain on the Council or whether I do not.

I also send you a copy of my letter to Mr. Scott sent on 4th May (to-day).—Yours faithfully,

CHAS. HEATHCOTE.

(Copy.)

W. G. Scott, Esq.— 3rd May 1904.

DEAR SIR,—Replying to your letter of 28th April, I am an ardent supporter of the principle of compulsory examination prior to a man being qualified to practise as an architect. This is at present called "Registration." I am distinctly in favour of the Statutory Qualification of Architects. But whilst reiterating this, and acting in the Council to the best of my ability to carry the proposal into effect, I do not consider the action of the independent "London Committee," of which you are the Honorary Secretary, is such as to strengthen our hands on the Council. There are many members of that Institute Council whose abilities have deservedly gained them their eminent positions as architects, whose opinions are known to have recently been strongly opposed to the Registrationists, but who have given patient, careful, and unbiassed attention to our opposite views, and have agreed with us in the advisability of something being done to improve the status of architects.

To fully discuss this important matter the Council, as you know, was enlarged by the addition of representatives from every Allied Society. At the very full meeting of this augmented Council-Committee, the subject was treated by every side in a liberal, business-like, level-headed manner, and many presumed differences seemed to vanish on being touched. It will be a thousand pities if an outside Society endeavours to force the pace. As a Registrationist I deprecate your suggestion. The work done already by the present men is excellent. If actual Registration be not the immediate outcome it is already assured that the status of the profession will be much raised in the early future.

I fully appreciate the *motif* of your Committee, and know you have only the best interests of the profession at heart. You consider your proposed course of action is the right one to pursue. It is in this I beg to disagree with you. If such procedure be carried through it will result in splitting the profession into two hostile camps, disadvan-

tageous to any idea of "improved status" or anything else worth having. I ask you, in all sincerity, to reconsider this proposal, and to give the present Council-Committee at least the credit for earnest, thoughtful, honourable consideration of a very difficult subject.

I am personally unable to go further with you than indicated in this letter, and beg to remain, yours faithfully,

(Signed) CHAS. HEATHCOTE

(Copy.)

W. G. Scott, Esq.—

4th May 1904.

DEAR SIR,—I wrote to you, under date 3rd May, my views respecting the R.I.B.A. Council and Registration. This letter you will have received to-day. Yesterday, 3rd May, you wired to me as follows:—

"Will name you as supporter of Registration unless you wire contrary.—SCOTT."

I was out of town yesterday and did not personally see that telegram until this morning, 4th May. The telegram was opened at my office in my absence, and the following answer was sent to you in my name:—"I support Registration, but prefer that the matter be dealt with by Council alone. Letter follows.—HEATHCOTE."

I only personally saw that answer this morning, and it is perfectly correct as far as it goes, but so that there shall be no misunderstanding upon this matter, I wish it to be distinctly understood by you and your Committee that I am not a party to your sending out the list of candidates named, and I decline to sign your circular. I consider the Council are doing their very best in this matter, and that your action is most inadvisable, for reasons stated in my letter of 3rd May.—Yours faithfully,

(Signed) CHAS. HEATHCOTE.

Obituary.

At the meeting last Monday the decease was announced of Norman Michael Brown, of Newport, Mon., *Associate*, elected 1887, author of the selected design for the proposed Technical Institute at Newport; Francis William Tasker, elected *Associate* 1874, *Fellow* 1903; George Henry Birch, elected *Associate* 1875, and recently retired.

The HON. SECRETARY (Mr. Alex. Graham, F.S.A.), in making the above announcement, observed that Mr. Tasker was recognised by all not only as a very estimable man, but as a very good architect. His works generally were well known to architects, and his so recent election as a Fellow made them regret the more the loss to their ranks of one who gave promise of attaining the highest distinction in his art. George Henry Birch, F.S.A., who died on the 10th May at the age of sixty-two, had been Curator of Sir John Soane's Museum in Lincoln's Inn

Fields since 1894, having succeeded the late Mr. Wyatt Papworth. The son of the late Dr. Samuel Birch, the distinguished Egyptologist of the British Museum, he was born in 1842, and was articled to Mr. Charles Gray, architect, in 1858, being subsequently with Sir M. Digby Wyatt and Mr. Ewan Christian. He became President of the Architectural Association in 1875, and was the hon. secretary of the London and Middlesex Archaeological Society from 1877 to 1883. Mr. Birch designed the Old London Street in the Health Exhibition, and was Cantor Lecturer to the Society of Arts in 1883, and vice-president of the St. Paul's Ecclesiological Society. He published *The Old House in Lime Street, City*, and *The Churches of London in the Seventeenth and Eighteenth Centuries*. He took a deep interest in the antiquities of the metropolis, and formed a valuable collection of London prints and drawings. Mr. Birch, Mr. Graham said, was a diligent student of architecture all his life, and nobody who had ever held that important and desirable post of Curator of the Soane Museum could have fulfilled the duties in a more excellent way than Mr. Birch. The Trustees would have great difficulty in finding a man equal in all respects to their late lamented colleague.

THE PRESIDENT said that Mr. Tasker and Mr. Birch were very old friends of his and of many other architects in that room and elsewhere. Mr. Tasker was a member of the Architectural Association. He was a man of singularly outspoken and determined views, both on art and on other matters. In the days when they were together at the Association Class of Design they used to criticise each other's works very candidly. From Mr. Tasker perhaps they heard the most candid criticism of all; he was a man who always spoke his mind, which is what Englishmen like; but he spoke it without any bitterness, and left no ill-feeling behind. He was a Catholic, and was fortunate in being the nephew of Miss Tasker, a most benevolent member of that Church, and this relationship secured to him early in life many important commissions. One of the earliest was the College in St. Charles' Square at Notting Hill, and when Miss Tasker died he had given such proof of his ability that to the end of his life he always had sufficient work from the Church to which he belonged. He himself always looked upon Mr. Tasker as an architect of remarkable ability, as one capable of building a cathedral had the opportunity ever come to him. He hoped his son, whom he knew very well, would be able to succeed him. George Henry Birch, whose funeral took place on Saturday, the President said was also a great friend of his and of many others who were at the Association at the same time. Tasker and Birch were there together. Birch was a man who gave himself from his youth to archaeological pursuits in connection

with architecture, and perhaps the work he would be best remembered by would be the "Old London" he created at Earl's Court. Now, of course, anyone could produce an "Old London"; but Birch was the first to do it, and it had never been done so well by anyone else. Birch belonged to a small coterie of which he (the President) was one, and for over five-and-twenty years they met month by month at each other's houses to sketch and draw—and one gets to know a man very well under those circumstances. He remembered Birch explaining his idea of Old London, and from the point of view of archaeological research and truth it was most excellent, and at the time entirely new. He did also a good deal of literary work. *London Churches of the Seventeenth and Eighteenth Centuries*—perhaps the best known of his works—was a very valuable production, giving not only photographs but a complete list and description of the various buildings represented. He built a very picturesque little church at Dartmouth, but owing to lack of funds it was never developed as fully as his talent would have enabled him to do. As one of the Trustees of the Soane Museum he (the President) had come in contact with Birch as Curator, and he should like to testify to the great obligations the Trustees were under for the loving care and attention he gave to that Museum, and for the efficiency to which he brought it. The visitors largely increased during his curatorship. He made himself thoroughly acquainted with the contents of the Museum; he was always there, and was always willing to give of the information he possessed. It was a great regret to them all to lose these gentlemen from their ranks.

THE ARCHITECTURAL ASSOCIATION.

THE Association are now fairly installed in their new home in Tufton Street, Westminster. The President (Mr. H. T. Hare) and Committee held their first reception there on Tuesday, the 10th inst., when a large number of members and friends had an opportunity of perambulating the building and observing the comfortable conditions under which the functions of the A.A. teacher and student will for the future be discharged.

Details of the transference to the Association of the premises of the Royal Architectural Museum and Westminster School of Art will be found in the JOURNAL for 22nd November 1902. The transfer carried with it the valuable collection of casts belonging to the museum, and the Association undertook, if the Royal Assent were given, to retain the name "Royal Architectural Museum," and to keep the museum open to the public.

The Association, as the premier architectural

teaching body in the United Kingdom, had long outgrown their accommodation in Great Marlborough Street. For years they had searched in vain for premises adaptable to their needs, and they had at length resolved to look out for a convenient site and build premises of their own. Building and equipment would involve a cost of at least £20,000, and practically the whole amount would have to be raised by the contributions of friends. A subscription list was opened in 1901, which the Association itself headed with £1,000, and by the end of the year some £2,000 more had been either given or promised. The Institute recently subscribed £500. An attempt was made by means of an influentially signed appeal in *The Times* to win the sympathy and support of the general public. The result was not encouraging; it became evident that what had to be done must be done by architects themselves. The possibility of the Institute and the Association joining in a building scheme was then discussed. A joint committee of the governing bodies considered the proposal, and reported in its favour, it being understood that the two institutions should occupy one site and have some of the accommodation in common, but that the respective premises should be to all intents and purposes separate buildings. Two members of the joint committee were commissioned to find a site. The practicability of the scheme was reserved for consideration when the site should be forthcoming. Meanwhile the Association had started the day school, and their needs were becoming daily more and more pressing. It was felt that unless suitable accommodation were almost immediately in prospect, the educational work of the Committee would be seriously affected, if it did not collapse altogether. As Mr. Aston Webb remarked at the reception in Tufton Street last week, the A.A. Committee were at their wits' end to know what to do, when the offer of the Museum arrived to put an end to their perplexities and lead to perhaps the most satisfactory of all possible solutions of the problem.

The transfer of the premises, with fixtures, fittings, and furniture—practically a free gift of the whole—took effect in March last year, and the work of remodelling and supplementing the buildings to fit them for their new requirements was at once put in hand; and very successfully has it been carried out by a former President of the Association, Mr. Leonard Stokes. It may be mentioned that the original cost of the Museum building was over £4,000, and of the School of Art studios £8,000. The combined annual rent is £250. The collection of casts is valued at some thousands. The Museum itself—a dreary place in the old days—will gain something in attractiveness from its new environment; and the public who visit it, presumably having some fancy for architecture, may come in time to sympathise with the great aim of the Association—viz. to

give its students the best possible training in the art and science of architecture—and so help to make it more widely known and appreciated.

The alterations and additions to the premises, with expenses incidental to the transfer, have brought the outlay up to over £10,000; and at the date of writing the Association are in debt to the extent of at least £5,000.

The Association have at last a home worthy of their aspirations, and as a consequence a widely extended sphere of usefulness opens out before them. But their efforts will be hampered by such an expensive burden of debt. The architect's is not a lucrative profession for the vast majority. That £3,500 has been raised among them speaks much for their vitality and public spirit. Seeing how greatly the community stands to gain by a highly trained and efficient body of architects, it would seem eminently a case for a grant out of the public funds available for technical training. It appears vain, however, to hope for help from this source—nor perhaps is it altogether desirable. It may be better and more fitting that ways and means be found within the profession itself for clearing off the debt. What the Association have achieved by their own efforts will doubtless stimulate them to still greater exertions; and, to quote Mr. Webb again, "the older architects must take care to see them through their difficulties."

The Association held their Annual Dinner—a numerously attended and very agreeable function—on the 13th inst., and Mr. Hare took the opportunity to render acknowledgment to those who have helped to bring about the great change in their prospects. They had, he said, several very good friends to thank for what had taken place. First, they must not forget the very important work done by his predecessor in the chair, Mr. W. H. Seth-Smith, for it was largely due to that gentleman's energy and initiative that the Association were in a financial position to avail themselves of the offer made by the Council of the Royal Architectural Museum through Mr. Maurice B. Adams. If they had not possessed the funds Mr. Seth-Smith's energy has supplied them with they would probably have been obliged to decline the offer. The best thanks of the Association are also due to Mr. Maurice B. Adams for the part he took in bringing the matter to a head, and to Mr. Leonard Stokes for the manner in which he has rendered the premises suitable to the needs of the Association.

MINUTES. XIV

At the Fourteenth General Meeting of the Session 1903-4, held Monday, 16th May 1904, at 8 p.m.—Present: Mr. Aston Webb, R.A., F.S.A., in the Chair, 18 Fellows (including 4 members of the Council), 15 Associates (including 1 member of the Council), 1 Hon. Associate, and visitors: the Minutes of the Meeting held 2nd May [p. 371] were taken as read and signed as correct.

The Hon. Secretary announced the decease of Norman Michael Brown, Associate, elected 1887, of Newport, Mon.; Francis William Tasker, elected Associate 1874, Fellow 1903; George Henry Birch, a past Associate, elected 1876.

The President announced the establishment by the Council of a Board of Professional Defence, and also of a Board of Architectural Education.

The following candidates for membership, found by the Council to be eligible and qualified according to the Charter and By-laws, were recommended for election:—As FELLOWS, Thomas Arnold (Assoc. 1867) (Edinburgh); Walter Albert Catlow (Leicester); Max Clarke (Assoc. 1880); Allan Ovenden Collard (Assoc. 1889); William Henderson Duncan (Rochdale); Edward Goldie; Alfred Henry Hart (Assoc. 1890); Charles Grove Johnson (Mexico); William Campbell Jones (Assoc. 1888); William Alfred Large; Thomas Edward Marshall (Harrogate); John Campbell Turner Murray; John Henry Phillips (Cardiff); Alfred Roberts; William Rushworth; Percy Burnell Tubbs; John Collingwood Tully (Assoc. 1882) (Cape Town, South Africa); Benjamin Woollard (Assoc. 1889). As ASSOCIATES, Charles Rosenthal (Qualified as Assoc., Colonial Exam. Sydney N.S.W. 1903) (Sydney, N.S.W.); Herbert Alfred Hall (Probationer 1899, Student 1900, Qualified 1903). As HONORARY ASSOCIATES, James Jebusa Shannon, A.R.A.; Lord Stanley of Alderley. As HON. FELLOW, The Right Hon. Lord Curzon of Kedleston, G.M.S.L., G.M.L.E., Viceroy of India.

A Paper by the Rev. J. B. Lock, Bursar of Gonville and Caius College, Cambridge, on THE PLANNING OF COLLEGIATE BUILDINGS, having been read by the author, and discussed, a vote of thanks was passed to him by acclamation.

The Chairman announced that the adjourned discussion on the Plenum System of Ventilation would take place at the Meeting of the 6th June. Also that a Special General Meeting would be held the same day with reference to an addition to By-law 3 to be proposed by the Chairman.

The proceedings then closed, and the Meeting separated at 10 p.m.

ALLIED SOCIETIES.

DEVON AND EXETER SOCIETY.

At the annual meeting of the Devon and Exeter Architectural Society, held on the 14th inst., Mr. A. S. Parker [F.], the retiring President, in the course of his address recalled that they were the first provincial society to be allied to the Royal Institute of British Architects. The foresight and sound judgment then shown by the Society were subsequently endorsed by the alliance of sixteen other societies in Great Britain, Ireland, and the colonies to the representative body in London. The benefits of such a communion were too manifest to need exposition. They were also the first society to suggest to the London

Architectural Association the extension of their teaching to the provinces, in conjunction with the local societies: the suggestion had been favourably received, and might lead to a favourable result in the future.

With regard to architectural education, which formed one of the principal subjects of discussion at the conference held at the Royal Institute of British Architects last year, and which he attended as representative of this society, he had strongly felt for a considerable time that the present system of pupilage, with the more or less feeble architectural instruction given at many technical colleges, was an extremely slow and inefficient means for modern equipment for such an art as theirs. There was a real need for a thorough course of art and technical instruction for students outside the routine of office work, combined with the mutual enthusiasm and friendly rivalry which could only be obtained by a class communion of students. All architects should assist to bring about a system whereby students may obtain a semi-collegiate training as a supplement to the system of pupilage. They could not expect public educationists to further their cause unless they themselves showed a strong desire and cause for such advancement. It should be a matter of congratulation to them that they had arranged with the London Architectural Association that students connected with the Devon Society would be able to join the Association's design class in the ensuing session.

As to the question of a compulsory examination by the Institute of all who wished to become architects, and the necessary registration of those architects now in practice, this was a question nearly half a century old, but within the last twelve months it had attained the position of "a burning question." It was quite evident by the votes and resolutions of the various societies that provincial architects were overwhelmingly in favour of the principle. He had the honour to represent the society on the Special Committee of the Institute now considering the question, and had attended the first meeting a few weeks ago. The question was received in a fair and open manner by all the members, and a sub-committee was appointed to draw up some scheme to be submitted to the next meeting for further discussion. The subject being *sub judice* he would not make any special comment upon it beyond that he believed that, should a satisfactory bill be agreed on and carried, architectural education would progress with rapid strides. A large number of students would not enter for the Institute examinations because they were not compelled, and their education suffered accordingly.

All architects must rejoice at the result of the recent judgment of the House of Lords in the case of *Colls v. Home and Colonial Stores*, whereby a portion of the question of ancient lights had been set at rest. Through a lack of definition,

the law of ancient lights had always been a source of litigation and a hindrance to building development. There was still room for improvement in the law, and he hoped the time was not far distant when no newly formed lights would be able to claim the rights of easement. In many parts of the country a call for some revision of the Building By-laws had been made with the object of classifying the regulations of the model code, so as to overcome the evils which necessarily accrue to "cast iron" rules having no qualifications.

He hoped the Society would use their best endeavours to prevent the demolition of ancient buildings of interest. The public should be educated to set a proper value on the remaining landmarks of historic interest, which once destroyed can never be replaced. Exeter would have vastly gained had not vandalism in the past been allowed to remove large numbers of ancient buildings, which would have greatly added to the interest of the city, and have been of commercial advantage in the attraction of a larger influx of tourists and visitors. He remembered two especially fine ancient houses in North Street having been removed for the widening of the street, which could have been attained by allowing the pavement to run under the upper stories, on the principle of the Butterwalk at Dartmouth; but no thought or ingenuity appeared to have been exercised. He was pleased to note that the Exeter Chamber of Commerce had decided to fix tablets on places of historic interest in the city. He himself had read a Paper making suggestions in detail to that effect before a special meeting convened by the Chamber of Commerce in 1893.

In briefly reviewing the public buildings completed or in course of erection during the past year within the province, the completion of Truro Cathedral at once called for congratulation to the Church and people of Cornwall, for being the means of producing, within a comparatively short period, a great and beautiful creation of architecture for the worship of God and for the use, uplifting, and delight of many generations to come. It was a remarkable fact that Cornwall had achieved what had not yet been achieved in other and richer parts of the kingdom. The original Cathedral Committee were fortunate in the choice of an architect in the late J. L. Pearson, R.A., as one who was able to recreate the very spirit of mediæval work. The Royal Naval College at Dartmouth was another building of national importance now in course of erection within our province. They had the pleasure of

inspecting this great building in its transitory state in September of last year, under the personal guidance of the distinguished architect, Mr. Aston Webb, R.A., who most courteously placed his time at their service. The College when completed would fully justify the selection of the architect by the Admiralty.

As to the future of architecture in this country, he believed there was hope for a fuller and richer development than ever before, owing partly to the continued expansion of wealth and more particularly to the revised system of art education. Fortunately the fetish held during the greater portion of the nineteenth century, that new buildings must be a slavish copy of some particular "style" pertaining to a period not their own, had now been practically abandoned, partly by the diversity of modern requirements, and partly by a new school of design which had been growing during the last twenty years, which set the expression of the purpose for which the building was intended as the motive which should govern its appearance. This doctrine still needed cultivation and development as the goal for correct design. Another trait which was being developed by architects of artistic temperament was simplicity and restraint in design, in contradistinction to the vulgar ideal that architecture consisted of ornament applied to otherwise plain structures. There could be no greater misconception than this. The science of good planning, combined with the use of the three materials stone, timber, and metal, openly shown in well-proportioned constructive lines and freely proclaiming the use for which the building was intended, were the elements out of which true architecture must be made. In addition to the cultivation of art, which should be born in an architect, the great diversity in the requirements of modern building required the closest application to master even a portion of an architect's studies. Such buildings as hospitals, asylums, theatres, churches, business premises, and warehouses, with their attendant modern steel construction, markets, town-halls, libraries, schools, and colleges, were constantly in a state of evolution, each needing special application of systems of heating, ventilation, and electricity. These subjects were all supplementary to the groundwork of construction and to the knowledge of historic architecture and ornament of past ages, and to the cultivation of architectural design. Only the very best culture and thought should therefore be applied to the creation of their art.

NOTES ON THE STRESSES IN FRAMED SPIRES AND DOMES.

By W. DUNN.

THE following notes were put together at a time when I was engaged in the design of a tower.

I found that while the stresses in structures with all the members in one plane, such as roofs and girders, are fully dealt with in writings on construction, very little has been written on that large class of structures wherein the members are in different planes. The subject is naturally more complicated, but by attacking the problem in the simplest form first, one is led on to the more difficult cases that occur in practice.

We cannot fix the sizes of the various parts of a structure without a more or less exact knowledge of the stresses to which these will be subjected, and I should be very pleased if the consideration which I have given to the subject were in any way helpful to others engaged on similar work or interested in similar questions.

VERTICAL AND SYMMETRICAL LOADS ONLY.

1. If we consider a plane frame formed of two upright and two horizontal bars ab , dc , and ad , bc , loaded, at b and c , with any weights, as in fig. 1, it is evident that, whatever be the loads, they are borne directly by the bars ab and dc , and that they produce no stress in the horizontals ad , bc .

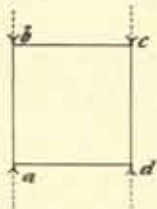


FIG. 1.

2. Suppose now that the supporting bars are inclined at equal angles to the horizon, and that the loads are equal (fig. 2). Draw to some scale the centre lines of the frame (i) as shown by the strong lines, and the lines of action of the loads, and supporting forces, as shown by the dotted lines. Letter each space so that we may identify each bar, load, or reaction by the two letters of the adjoining spaces; thus the horizontals are ce and ae , the inclined bars be and de , the loads bc and dc , and the reactions of the supports ab and ad . Lay off to some scale of tons, cwt., or lbs. (ii) the loads bc , cd as in the figure. Consider the joint where the bars be , ce , and the load bc meet. From the ends of bc in (ii) draw lines parallel to be , ce , identifying their intersection by the letter e . Then be , ce in (ii) measured to the same scale to which we have drawn be represents the stress in be , ce . To determine the nature of these stresses draw a small circle, as in (iv), with the lines be , ce , and bc radiating in the proper directions from it, and sketch the triangle of forces bce alongside. The direction of bc is known,

being downwards; attach the arrowhead to it, and put arrowheads to the other two sides of the triangle, so that they follow round in cyclic order. Then on the lines radiating from the circle put corresponding arrowheads; as the arrows point toward the circle the bars be , ce are both in compression.

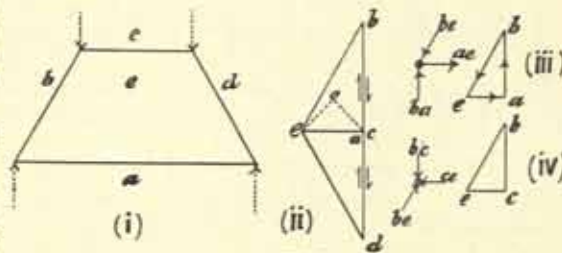


FIG. 2.

Next consider the joint formed by the meeting of ae , eb and ba . Knowing the amount and direction of be in (ii) we draw from the ends of it lines parallel to ba and ae ; these coincide with bc and ec . Sketch the circle and radiating lines, and the triangle of forces as before (iii); knowing that ab acts upwards, affix the arrowheads in cyclic order in the triangle, and transfer them to the lines radiating from the circle; be , as before, points toward the circle, and is in compression, but ae points away from it, and is in tension.

3. Take next the frame shown in fig. 3 (i)—also a plane frame—loaded by vertical weights at each joint, the loads being equal on each side. Letter the spaces as before and lay off (ii) bc , cd , de , ef ,

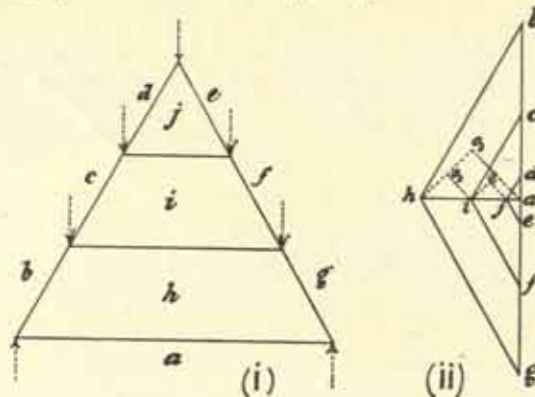


FIG. 3.

fg , upon a vertical line. Beginning with the load de , resolve it along the bars dj , je by drawing lines from the ends of de (ii) parallel to these

bars, and meeting in the point j . Proceed similarly with the rest of the frame until the stress diagram is completed; then, as before, the stresses in the bars of the frame in (i) are shown by the length of the corresponding lines in (ii), measured to the scale of tons, cwts., or lbs., to which the loads $b c, c d, &c.$, were laid off.

4. Fig. 4 (i) shows another form of plane frame. As it is symmetrical, and the loads are also symmetrical, we have only made the stress diagram for one half, the other half being similar. These loads are supposed applied at the joints, and the lines of action are shown by dotted lines.

Begin by lettering the spaces; then lay off the loads in (ii) to any convenient scale, as shown by $a b, b c, c d, d e$. From the ends of $a b$

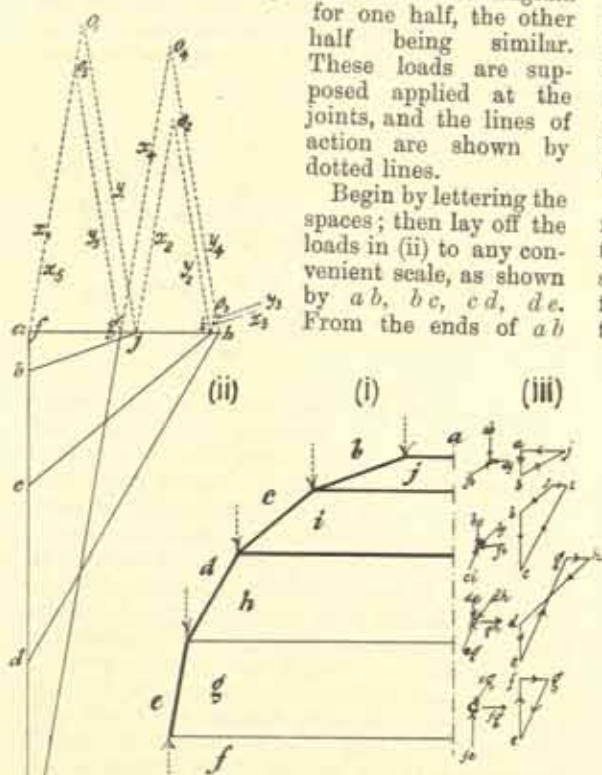


FIG. 4.

draw lines parallel to $a j, b j$, and letter the intersection j . Proceeding to the next load, we have the amount and direction of $b j$, $b c$; from j and c , draw lines parallel to $j i, c i$, lettering the intersection i , proceeding thus until the diagram is completed.

In (iii) the sketches (not drawn to scale) show the method of determining the nature of the stresses, the thick lines in (i) showing the pieces in compression, and the thin lines the pieces in tension.

5. Before we leave these plane frames, consider the effect of altering the shape of the frame without altering the loads. If, in fig. 2, the slope of $b e, e d$ be made flatter, the stress in these bars, and in $c e, a e$ is increased; if the slope be made steeper, the stresses are correspondingly diminished until when $b e, e d$ become upright the stress in these is equal to the loads, and the stresses in the horizontals

disappear. Similarly, in fig. 3, if the loads remain constant, while the slope of the raking bars is made flatter, the stresses in these, and in the horizontals, are increased, while the stresses are diminished if the slope is made steeper. In fig. 4 the dependence of the stresses on the inclination of the bars is made evident. Thus the stress in $h g$ is a tension; but by making $g e$ less steep the stress in $h g$ can be made equal to zero, or become a compression.

6. Let fig. 2 (i) represent a section through two opposite angles of the four-sided square frame shown in plan in fig. 5, the loads on the points 2, 3, 6, 7, being equal to each other, and to $b c$ or $c d$ in fig. 2 (ii). Then the latter figure shows the stresses, excepting that as the stresses along $c e, a e$ are not resisted by single bars, but are resolved along the lines 1 8, 1 5, and 2 7, 2 6, respectively, the stresses $c e, a e$ are to be resolved into components parallel to those lines. From e and c , therefore, draw lines parallel to 1 8 and 1 5 (that is, at angles of 45 degrees) to meet in O ; then $o e, o c$, measured to the scale to which $b c, c d$ is plotted, give the stresses in 1 8 and 1 5, or 2 7, 2 6. As the frame is equally loaded at 2, 7, 3, and 6, there are equal and opposite reactions at all the points of the frame on this level.

7. If fig. 2 (i) represented a section through two opposite angles of a regular polygon, say, of eight sides, as shown in plan in fig. 6, the lines $e o, c o$ would be drawn parallel to the sides of that octagon 1 2 and 1 8 (that is, at angles of $22\frac{1}{2}$ degrees).

8. If, instead of a plane figure, fig. 4 is taken as a central section through opposite angles of a polygonal dome, formed of ribs and rings, the plan of which is shown in fig. 7, then the same stress diagram applies; but as the bars $f g, g h, h i, i j$, and $j a$ are replaced by ribs or rings the corresponding stresses must be resolved along lines parallel to these ribs or rings, as x and y in fig. 7. This is done by making $a o_1, j o_1, &c.$, in fig. 4 (ii) parallel to x_1 and y_1 ; $a o_1, j o_1$ show

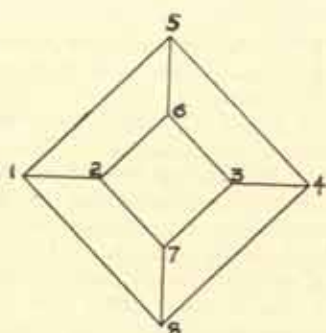


FIG. 5.

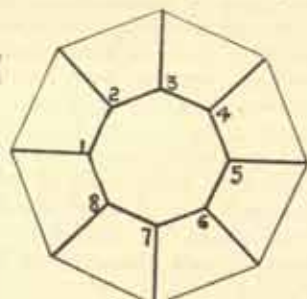


FIG. 6.

then the stresses in the top ring. Note that these act in a plane at right angles to the others—i.e. in a horizontal plane. As all the loads are symmetrical, all the corresponding bars have the same stresses.

9. This example indicates the general nature of the stresses in domes, which stresses we may divide into two classes: namely, stresses acting in vertical planes which are always compressive, and stresses acting in horizontal planes which are

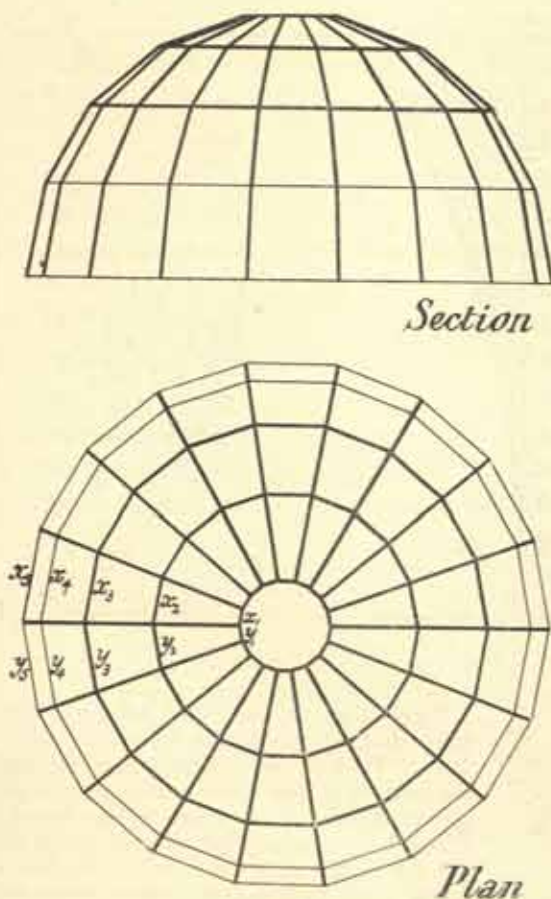


FIG. 7.

usually tensile in the lower part and compressive in the upper. The top ring will always be in compression, and the bottom ring in tension.

To show how the stresses may be modified by the loading, assume a heavy lantern upon the top of this roof (fig. 7), and let fig. 8 be the corresponding stress diagram, where ab to the previously chosen scale of loads represents that portion of the weight of the lantern bearing upon the half rib; or, as we are dealing with an eighteen-sided figure, one-eighteenth of the weight of the lantern. By completing the diagram we find that all the rings except the top ring are in ten-

sion. Without the lantern, and under the loads in fig. 4 (ii), the dome tends to burst out at the first and second or bottom rings, and to collapse inwards at the third, fourth, and fifth or top rings.

The effect of adding the lantern is to make the whole dome tend to burst out except at the top ring.

10. It will readily be seen that the loads might be so arranged that all the stresses in the rings, except in the top and bottom rings, would disappear, the stress diagram taking the form shown in fig. 9; or the form of the dome, if the loads were fixed, might be so varied as to produce the same result. Such a dome would be maintained by the united action of the ribs acting as simple arches. The stress diagram shows also that an alteration in any load has no effect upon the ribs or rings above it.

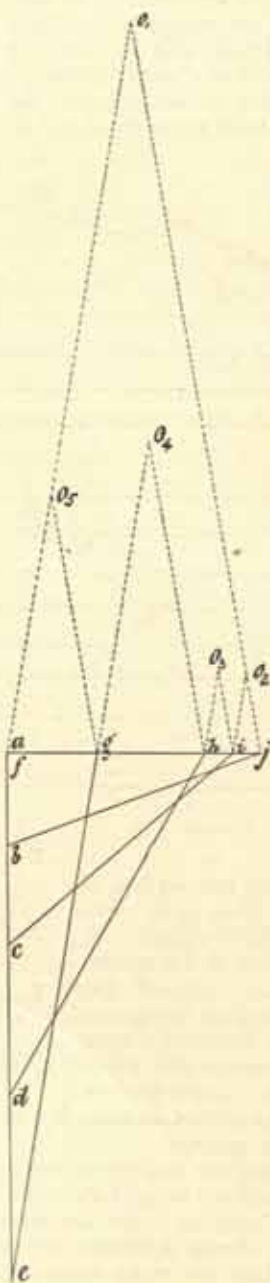


FIG. 8.

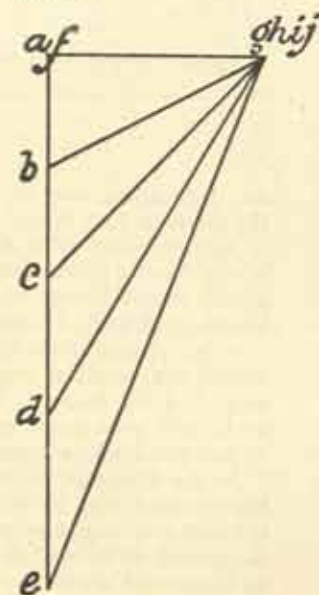


FIG. 9.

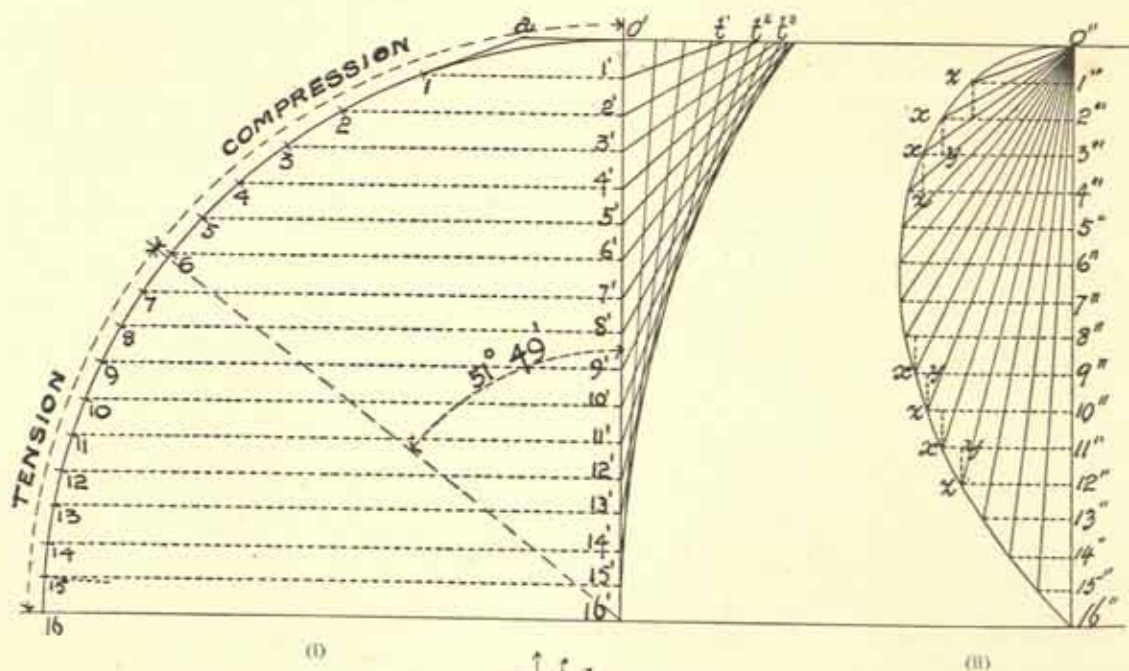
11. If the number of ribs and rings increases indefinitely we approach what Rankine has called the true dome—i.e. a thin shell forming a solid of revolution round a vertical axis. This forms the next example. Fig. 10 (i) shows the half-section

of the dome, which is hemispherical, and of metal capable of resisting tensile and compressive stresses, of uniform thickness, and of uniform weight per square foot.

Assume the centre line as representing to some scale yet to be determined the weight of the dome, or of some section of it. Divide this line into any number of convenient parts—for convenience we have taken sixteen equal parts—and mark the divisions 1', 2', 3', &c. Draw through 1', 2', 3',

over the section, and the line $O' t'$ the radial thrust, all measured to the same scale (not yet determined) as $O' 16'$.

If the point 1 were taken very near the crown, the load would be very small, and the horizontal thrust and direct stress would also be reduced; at the crown itself there is no stress. This is one of the material points of difference between the dome and the arch, which latter construction has always a thrust at the crown.



&c., horizontal lines to cut the section of the dome in 1, 2, 3, &c. Then as the area of any segment of a sphere equals $c h$, where c is the circumference of the sphere, and h is the height of the segment, any length, such as 2', 3', or 5', 6' on the centre vertical, measured on the same scale upon which that vertical represents the whole weight of the dome or the chosen portion of it, will give the weight of the segment 2, 3 or 5, 6 of the dome or chosen portion.

As the thickness of the dome is inconsiderable the pressure may be considered as uniformly distributed over any section, such as 1, and therefore tangential to its surface. Draw through 1 a line $1a$ tangential to the surface (at right angles to the radius $1', 16'$) and through O' produce $a O'$ indefinitely. Through O' and $1'$ draw $O' t'$ and $1' t'$ parallel to $O' a$ and $1a$ respectively to intersect in t' ; we have then the triangle of forces holding that part $O' 1$ of the dome in equilibrium. $O' 1'$ is the weight of it (being the load on point 1), the line $1' t'$ the direct compression uniformly distributed

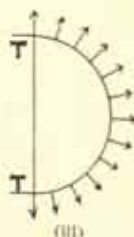


FIG. 10.

Proceeding to section 2 we form the stress diagram, giving the four-sided figure $1' 2' t' t^2$, $1' 2'$ being the weight of the segment, $1' t'$ the direct stress upon the lower section; $t' t^2$ giving radial thrust. Proceeding similarly for the remainder of the figure, the direct thrusts cut the horizontal lines further and further from the load line until we reach 6, when the inter-

sections begin to approach the load line again, making the polygon of forces for each section similar to the four-sided figure $ghde$ in fig. 4 (i).

12. [The diagram of stresses may take another form given at (ii). Set off the load line as before, and through O'' draw lines tangential to the surface of the dome at the various points to intersect with the horizontal lines. Through these intersections draw the curve from O'' to $16''$. Then we have the stress diagram, but of the form x, y, z, o'' , the radial thrusts above the point where the curve turns to the load line again, and the radial tensions below that point being given by the differences x, y .

This radial thrust and tension may be made more clear by referring back to fig. 4, in which aj, ji, ik may be called the radial thrusts, and hg, ga the radial tensions. As in that diagram these thrusts and tensions were resolved along the rings, so in this case the xy 's must be resolved into equivalent thrusts or tensions acting at right angles to the plane of the paper; that is actually upon the vertical faces of the section.]

13. Let $0'16'$ represent the total weight of the dome, then any xy shows the total radial thrust upon the corresponding section, which we shall call R . Being uniformly distributed, its intensity per unit of circumference equals

$$\frac{R}{\text{units in the circumference}}$$

just as the intensity of pressure on a pillar equals the total pressure divided by the units of area in the pillar.

In any circular ring under uniform normal pressure (fig. 10 (iii)), as in a cylinder holding water, the resultant tension or compression T (which we call hoop tension) equals the intensity of the radial pressure multiplied by the radius,

$$\frac{R \times \text{radius}}{\text{circumference}} = \text{hoop tension} = T.$$

This $\frac{\text{radius}}{\text{circumference}}$ is a constant quantity for any circle, and equals $\frac{1}{6.2832}$ nearly, so that $\frac{R}{6.2832} = T$.

When, therefore, $0'16''$ represents the total weight of the dome, we must divide each xy by 6.2832 for the hoop tension.

Suppose we take $0'16''$ to represent $\frac{1}{6.2832}$ of the weight of the dome, then we will not require to divide the xy 's in fig. 10 (ii), or, what is the same thing, the lengths $0'l', l't^2$, &c. in fig. 10 (i), as they will each equal the hoop tension at that point; i.e. if we take, not the weight of 360° , but $\frac{360}{6.2832}$ or 57.3° of the dome, the xy 's, or $0'l', l't^2$, &c., give the hoop tension or compression directly.

Form such a scale that $0'16'$ measures the weight of 57.3° of the dome; the lengths xo'' in (ii) measured to that scale give the total compression on a horizontal plane on a segment of 57.3° of the dome, or the lengths $1'l', 2'l^2, 3'l^3$, &c., in (i) may equally be used.

As the length of an arc of 57.3° equals its radius, we have only to divide the lengths $0''$ by the radius at the corresponding points to get the intensity of pressure on the horizontal section.

14. At the joint of no hoop thrust or hoop tension the maximum horizontal thrust is caused. This joint is frequently called the joint of rupture; it

is situated at a height above the springing line of $\frac{1}{2}(\sqrt{5}-1)$ radius, or about $51^\circ 49'$ from the vertical. Above that joint the dome tends to collapse inwards; below it tends to spread outwards.

15. The results in paragraphs 11 to 14 inclusive are assumed by some writers to apply to stone domes of considerable thickness; but they are only correct for thin domes of material capable of resisting tension and compression, of true hemispherical section, and of uniform weight per unit of surface. If we put an "eye" to the dome (i.e. omit the central upper part—say, the part above the line $11'$) then the horizontal line $0'l', l't^2$, &c., is lowered to the level of $11'$, and the position of the joint of rupture is also lowered. If a heavy load were put at 1 , then it would be raised, increasing the part under hoop tension and diminishing the part under hoop compression. If the section is varied and becomes pointed or of any other curvature, there is also a change in the position of this joint.

16. Note that in the thin hemispherical dome we have been considering (fig. 10) there is no outward thrust upon the abutments.

If the dome is a segment of a sphere less than a hemisphere, i.e. if the springing line is not at $16'16$ in fig. 10 (i), but at the level of say $9'9$, there is an outward thrust to be taken by the abutments or by a ring at that level. The stress diagram for such spherical dome less than a hemisphere is represented by that part of the stress diagram in fig. 10 (i) which lies above the level $9'9$, the part of the stress diagram $9'$ to $16'$ being supposed removed. But while as before the lengths of the type $0'l', l't^2, l^2t^3$, give the hoop tensions or thrust upon any division above the springing line, there is at that line an outward thrust, which is the horizontal component of the line $9'l^0$, and is equal to $0'l^0$. It may make this clearer if we remember that from the crown downwards at each ring or segment, we are constantly adding the horizontal thrusts of the type $0'l', l't^2$ (xy in fig. 10 (ii)), until we come to the joint of rupture or no hoop pressure. At that point the horizontal thrust to be taken by the abutments or by a ring at the base is a maximum, and is the sum of all the $0'l', l't^2, l^2t^3$, &c. in fig. 10 (i) (or xy 's in fig. 10 (ii)); below it the horizontal thrust is still the sum of the xy 's, but these xy 's change sign, becoming tensions, and act in the opposite direction to those in the upper part of the dome, so that we take the algebraic sum. The outward thrust thus diminishes from the joint of rupture downwards until it is zero at the base of a hemispherical dome. For the segmental dome there is always a horizontal thrust at the base, which is the algebraic sum of the xy 's. It may be ascertained directly by laying off the vertical line representing the weight of the part considered (say $0'9'$ in fig. 10), drawing through $0'$ a horizontal line, and through $9'$ a line tangential to the surface of the

dome at the springing 9, to intersect in t^9 ; then $O't^9$ is the horizontal thrust to be resisted by the abutments or by a ring at the base. If the load-line $O'9'$ represents not the total weight of the dome, but the weight of $\frac{57\cdot3}{360}$, the line $O't^9$, measured to the scale of loads, gives the tension in the segment at the base.

17. Instead of the resistance to spreading outwards being supplied by a metal ring at the base, it may be given by the stability of the supports, such as a circular wall, or by a series of buttresses.

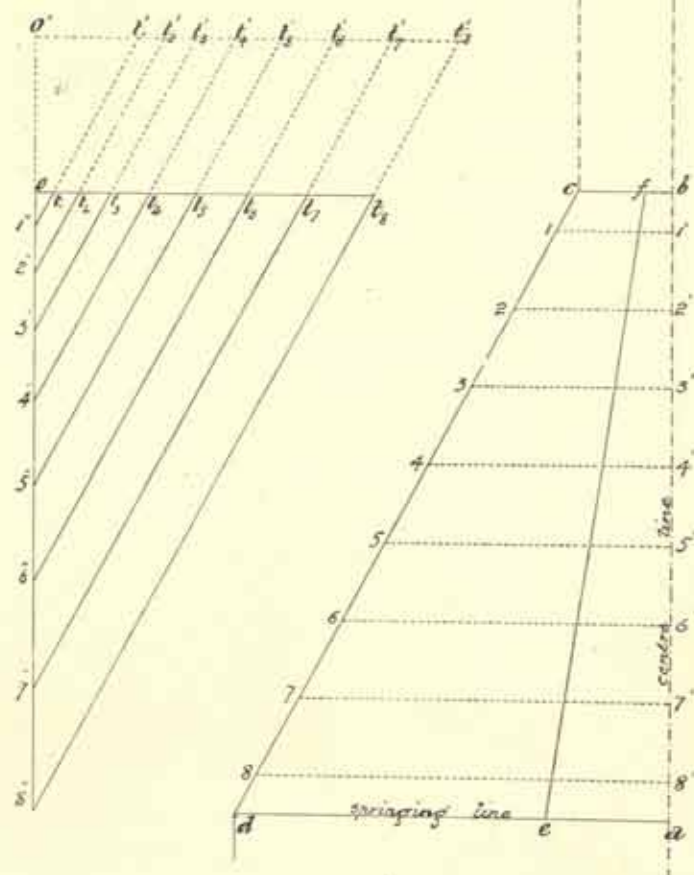


FIG. 11.

In that case it may be desired to know the outward radial thrust rather than the hoop tension. The outward thrust per degree of circumference is given by the line $O't^9$, measured to the scale of loads and divided either by 360° or by $57\cdot3$, according as the load line has been taken to represent the total weight or the weight of $\frac{57\cdot3}{360}$ of the total.

Rankine gives an analytic solution of this hemispherical dome in his *Applied Mechanics*.

18. Let us now turn to the case of a conical

dome also of thin material of uniform thickness, capable of resisting both tension and compression, and let $abcd$ in fig. 11 be the half central section.

To draw the stress diagram, it is necessary to know the proportionate weights at each part of the height. Divide the height into, say, eight equal parts, and through the centres of these equal parts, 1, 2, 3 . . . 8, draw horizontal lines to intersect the centre line. Then the lengths of these lines, $1'1'$, $2'2'$, $3'3'$. . . $8'8'$, are proportionate to the weight of each corresponding division. We can lay off on a vertical load-line lengths equal to $1'1'$, $2'2'$, $3'3'$. . . $8'8'$ in regular succession, and that vertical load-line would then represent to some as yet unknown scale the weight of the dome, and be divided in proportion to the weights of each corresponding part of equal height. As the full radii would often lead to a stress diagram of too large a scale, we may take proportionate parts of the radii by drawing the line ef cutting off, say, $\frac{1}{3}$ or $\frac{1}{4}$ of the lengths $1'1'$, $2'2'$, &c., and using the radii so reduced.

We use the reduced radii in this case, and accordingly set off from 0 the lengths $0'1'$, $1'2'$, $2'3'$. . . $7'8'$ equal to the lengths of $1'1'$, $2'2'$. . . $8'8'$ cut off by the line ef . Take the total length $0'8'$ to represent the total weight of the dome $\div 6\cdot2832$; then the scale for the stress diagram is found by dividing that length $0'8'$ into the number of lbs., cwts., or tons contained in

$$\frac{\text{weight of dome}}{6\cdot2832}$$

Next, as in the spherical dome, we have for the stress at 1, the load or the weight of the first of the eight divisions into which we divided the dome, acting vertically, represented by $0'1'$; then the resistance offered by the lower part of the dome,

which we take as acting in the centre line of the shell, and accordingly shown by a line $1'1'$ t_1 parallel thereto. We have also the resistance supplied by the hoop pressure acting horizontally and therefore by the line $0't_1$. The triangle $0'1't_1$ is then the triangle of forces acting at the point 1, and holding the uppermost of the eight divisions in equilibrium.

Take next the point 2. We have acting on the upper face the stress $1't_1$ just found; then the weight of the second division, acting vertically downwards through the point 2, and represented

in the stress diagram by $1'' 2''$, then the reaction of the lower part of the dome which is drawn parallel to the slope of the dome as before, and the hoop pressure $t_1 t_2$, drawn horizontally from the upper end of $t_1 1''$, to intersect with $2'' t_2$. Thus $t_1 1'' 2'' t_2$ is the polygon of forces for the point 2.

The lengths of the type $o t_1, t_1 t_2, \dots, t_7 t_8$ give the hoop compressions when the line $0 8''$ represents to some scale the total weight of the dome $\div 6.2832$. All these hoop pressures act outward, and at the base we have either to supply a hoop tension by means of a metal ring, or a resistance to spreading supplied by the abutments. This hoop tension or resistance must be equal to the sum of all, $o t_1, t_1 t_2, t_2 t_3, \dots$, &c.; in other words, at the base of the dome we should have acting the stress $8'' 0$ the vertical reaction of the abutment (equal to the weight of the dome) and a hoop thrust or tension equal to $o t_8$. The triangle of the forces acting at d is thus: $o t_8 8''$.

The hoop pressures $t_1 t_2, t_2 t_3$, &c. are the mean pressures acting on the divisions of the dome to which they apply, and the mean pressure on the material in a plane normal to the vertical section is equal to $t_1 t_2, t_2 t_3$, &c., divided by the area of the section on which any such hoop pressure acts—i.e. the raking length of any division, multiplied by the thickness of the shell of the dome.

19. Suppose now that the dome, instead of having an eye at the top had a load, such as that of a lantern acting at 1. Then in the stress diagram our first load would be represented not by the short line $0 1''$, but by some longer line $0' 1''$ which, measured to the scale of loads, would be equal to the load of the lantern, or the load of lantern $\div 6.2832$, according as our load-line represented the total weight of the dome or the

$\frac{1}{6.2832}$ part of it. The changed form of the diagram is shown by the dotted lines, the points $t_1 t_2 \dots t_8$ being now found at a higher level, $t_1' t_2' \dots t_8'$, and the meridian stresses $1'' t_1, 2'' t_2, \dots, 8'' t_8$ being increased to $1'' t_1', 2'' t_2', \dots, 8'' t_8'$.

Rankine gives the analytic solution of these conical domes with and without lanterns in his *Applied Mechanics*.

As we have said before, this method of graphical study is equally applicable to any shape of dome. The mathematical method is more or less limited to regular curved outlines.

LATERAL FORCES AND IRREGULAR LOADING.

20. We need not discuss here the question of wind pressure upon surfaces inclined at any angle to its direction; we may refer to the various papers on that subject for the most recent estimates of its values, and by multiplying the ex-

posed area by the corresponding pressure per unit of surface, ascertain the amount to be provided for.

Let the structure shown in fig. 12 be acted on by a wind pressure W , acting at a distance l , above the section bc ; it is required to find the stresses produced by W on the part $abcd$.

Dealing first with this as a plane figure, we know that W produces on the section bc , a bend-

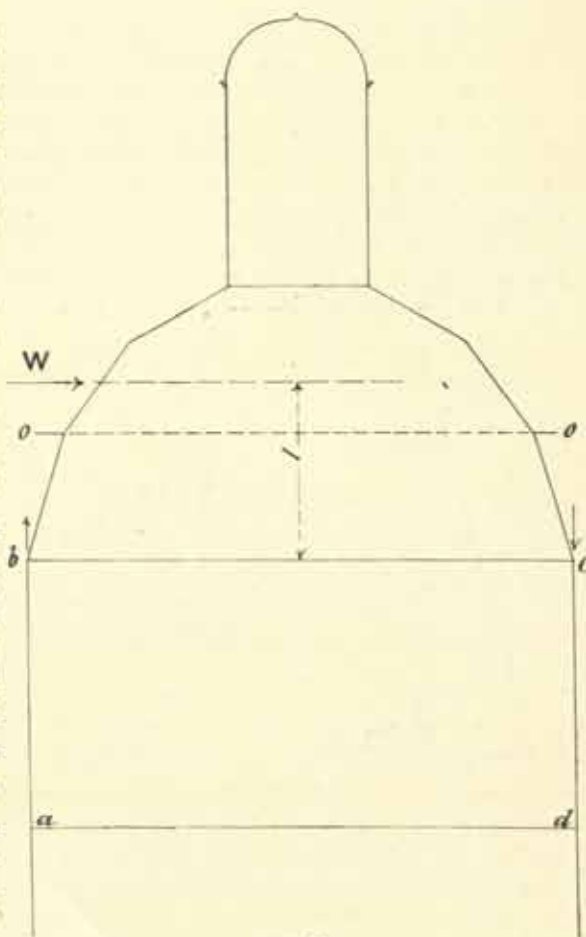


FIG. 12.

ing moment equal to Wl , and a shearing force equal to W .

The bending moment produces an upward pressure at b , and a downward pressure at c , equal

$$\text{to } x = \frac{Wl}{bc}.$$

21. If we are dealing with some section oo' , where the bars resisting these stresses are inclined at equal angles to the horizon in place of being upright, as in fig. 13; then let o , fig. 14, represent the point b , where there is acting an upward force (1) of $\frac{Wl}{bc}$; a horizontal force (2) of $\frac{W}{2}$

(assuming that the shear W acts equally at b and c); the force (3) in the bar ab , and the force (4) in the bar bc .

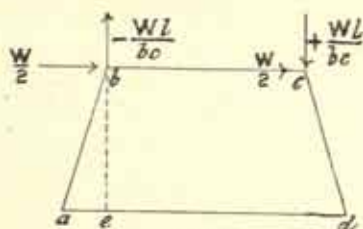


FIG. 12.

Set off to some scale $1.2 = \frac{Wl}{bc}$; draw 2.3 parallel to ab ; through 1 draw 3.4 = $\frac{W}{2}$, and connect 4.3. Then 2.3 measured to that scale is the stress on the bar bc , and 4.1 the shear to be provided for at b , as the resistance to lateral action of the inclined bar ab ($= 3.1$) provides

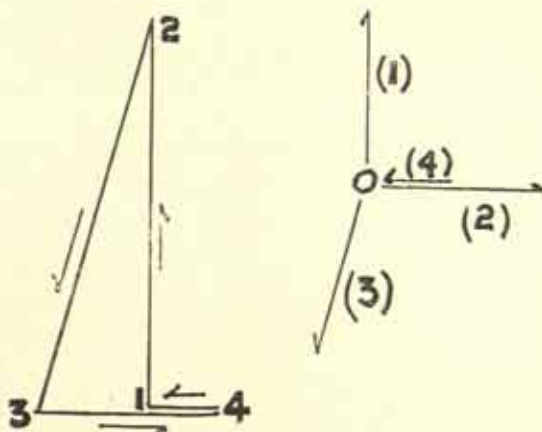


FIG. 14.

the remainder. The stresses at the point c are similar but opposite, with the exception of the shear 4.1, which is equal in magnitude but in the same direction as at b .

When, therefore, the bars supporting the section in question are not upright, but inclined as in the last figure, the shear to be taken by the bracing is reduced to $W - \left(\frac{ad - bc}{bc} \times \frac{Wl}{bc} \right)$ being the total shear less the amount taken up by the slope of the legs.

22. Imagine next that fig. 12 represents the central vertical section of a square-framed figure, the plan of which is shown in fig. 15. The upward pressure at b and the downward pressure at c would still equal $\frac{Wl}{bc}$ when the wind producing the bending moment Wl acted in the direction bc (the direction of the diagonal); the bars at

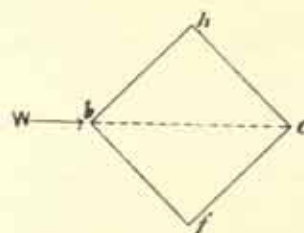


FIG. 15.

23. But if the frame be eight-sided in plan, as in fig. 16, the wind still acting in the direction of the diagonal, then in place of the resistance to bending being supplied by two points only, it will be supplied by six—three on each side of the neutral axis, there being still no stress due to bending on h and f (that is, assuming that the frame is so constructed as to act as one whole).

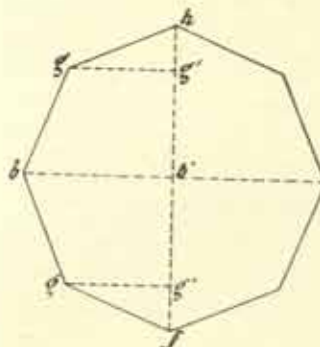


FIG. 16.

The stress upon the points b and g will vary according to the distances from the neutral axis hf . If, therefore, we call the pressure at b , say, x , we find the pressure at g by a simple proportion,

$$\text{as } bb' : gg' :: x : \text{pressure at } g,$$

$$\text{that is } \frac{gg' \times x}{bb'} = \text{pressure at } g.$$

The moment of resistance at b , being the pressure multiplied by its distance from the neutral axis, is $x bb'$, and at g correspondingly is $x \frac{gg'}{bb'} gg'$. Adding the whole six we find the

total moment of resistance equals

$$2x bb' + 4x \frac{gg'}{bb'} gg'.$$

But $2bb'$ equals the diameter bc ; therefore the total moment of resistance equals

$$\text{diam. } x \left\{ 1 + 2 \left(\frac{gg'}{bb'} \right)^2 \right\}.$$

As in every regular octagon, the ratio $\frac{gg'}{bb'}$ is constant and equal to .705, we may write the last equation

$$\text{diam. } x \cdot 1.99 = \text{Moment of resistance.}$$

As the bending moment (Wl) is equal to the moment of resistance (diam. $x \cdot 1.99$), we find the maximum pressure x by dividing the former by diam. 1.99, or

$$x = \frac{Wl}{\text{diam. } 1.99} = \frac{Wl}{bc \cdot 1.99}$$

This, as before, is tension on the windward side and compression on the leeward side.

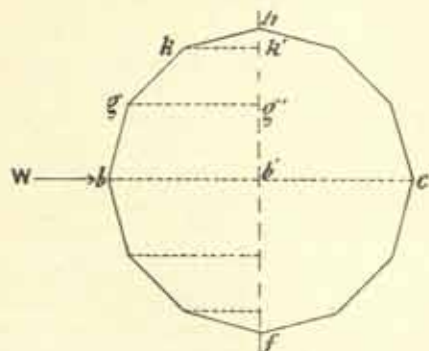


FIG. 17.

24. Suppose instead of an eight-sided we had a twelve-sided regular polygon. Then the total moment of resistance would be

$$2x \cdot b \cdot b' + 4x \cdot \frac{gg'}{bb'} \cdot gg' + 4x \cdot \frac{kk'}{bb'} \cdot kk'$$

$$= \text{diam. } x \left\{ 1 + 2 \left(\frac{gg'}{bb'} \right)^2 + 2 \left(\frac{kk'}{bb'} \right)^2 \right\}$$

$$= \text{diam. } x (1 + 1.479 + .5) = \text{diam. } x \cdot 2.979,$$

and for the maximum pressure at b and c (tension on windward, compression on leeward side)

$$\frac{Wl}{bc \cdot 2.979}$$

We would proceed similarly for any other regular-sided polygon, and find for an eighteen-sided figure the moment of resistance would be = diam. $x \cdot 4.526$.

25. Besides the bending moment, which increases the pressure on one side and diminishes it on the other, by tending to overturn the structure, there is a shearing force tending to slide it bodily along in the direction of the wind.

Let fig. 18 show the plan of a square structure, and let W represent the direction of the wind. The shearing force tends to make it assume the position $a'b'c'd'$ shown by the strong lines. The

resistance to this change is supplied by the bracing in the faces ab, cd , the shear in each being equal to $\frac{W}{2}$. The faces ac, bd

do not supply any resistance to this force.

26. In fig. 19 we show an octagon and indicate the change in form under a shearing force by the strong lines. If we call the stress in the bracing bc unity, the stress in the bracing ab may be found by the "virtual velocity" of the force in ab . Let the points $abc \dots$ pass to the positions $a'b'c' \dots$;

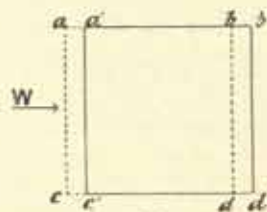


FIG. 18.

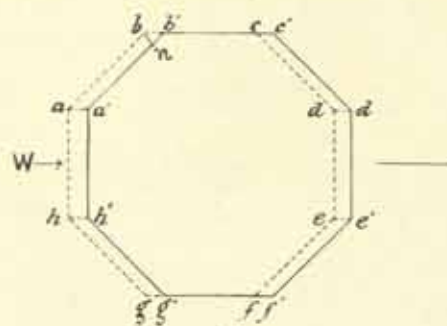


FIG. 19.

draw through $b, b'n$ at right angles to ab ; then the maximum displacement is $bb' = \text{unity}$, and the virtual velocity of the force along $ab =$

$$n \cdot b' = \frac{bb'}{\sqrt{2}} = \frac{1}{\sqrt{2}}, \text{ as the frame is a regular octagon.}$$

The shear is proportional to this, and the total stress in the bracing resisting shear = $1 + 1 + 4 \left(\frac{1}{\sqrt{2}} \right) = 4.8$, when the stress on bc is considered unity.

If we had a twelve-sided figure, we should find that the total shear would be 7.2 times, and for an eighteen-sided figure 13.3 times the shear in one of the parallel sides.

27. To find the maximum stress which occurs on each of the faces bc, fg , we divide the total shear by the number thus:

$$\begin{aligned} \text{shear on } bc &= \frac{\text{total shear}}{4.8} = \frac{W}{4.8} \end{aligned}$$

This shear might be taken up by two diagonals as shown by the dotted lines in fig. 20, each capable of resisting tension

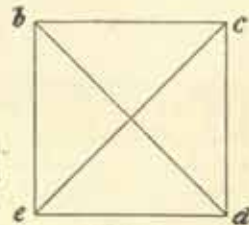


FIG. 20.

and compression, and bearing half or $\frac{W}{9.6}$; if the

bracing bars bd, ec , resist tension or compression only, the shear in each would be as before $= \frac{W}{4 \cdot 8}$.

To find the direct stress in the bracing bar ec , we should increase this in the proportion of ec to bc .

28. It will be noted that motion or tendency to motion in the plane of the bracing produces stress according to the extent of that motion or tendency;

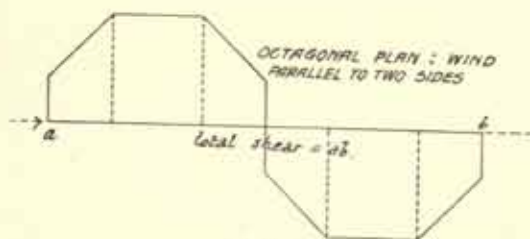
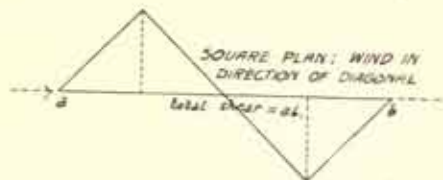
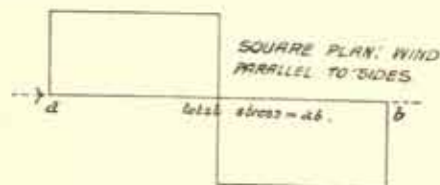


FIG. 21.

neither motion nor tendency to motion in the direction at right angles to that plane produces stress in the bracing. Accordingly, there is no shear in the faces ah, de , fig. 19, and the motion bb' of the face ab is supposed to be compounded of two motions, one bn , in the direction at right angles to the plane of the bracing, producing, therefore, no stress in it; and one nb' , in the plane of the bracing, and producing a corresponding stress.

29. If we have any regular-sided polygon to

deal with, we proceed in the same manner. The amount of shearing stress on any face may be found graphically as follows: for any plan, draw one half the plan on one side of a centre line ab , and repeat the other half on the other side of the centre line as in fig. 21, where shear diagrams are drawn for a square plan, lateral force parallel to one face; square plan, force in the direction of the diagonal; hexagonal plan, and octagonal plan, force parallel to two faces.

Then let the length ab represent to some scale the shear W at the section considered; the projection of any side on this line, measured to the same scale, will give amount of shear taken up by that side. Note that the shear when acting in a direction parallel to the diagonal of a square, produces a less effect on the sides than when acting in a direction parallel to a side.

30. In any dome formed of ribs and rings, with wind bracing between, we may first find the stresses due to the weight of the structure itself by the graphical method in the preceding section, and write these against the corresponding pieces in the drawing, or put them into tabular form. Next above every section find the total wind pressure and its centre of action, and thence deduce the maximum stresses produced in the ribs, adding the compressions and deducting the tensions, to and from those due to the weight of the structure. On the leeward side the pressure will be increased, and on the windward side diminished, but usually there will still be compression on the windward rib. Then find the maximum shear on any face at each section, which will be the total wind pressure above that section (reduced as before, if the section has inclined sides), divided by two in the case of a square, or $4 \cdot 8$ in the case of an octagon, which maximum shear must be divided by the number of bracing bars acting in each panel, and increased by the ratio of the inclined length to the horizontal as already explained. We shall then have all the stresses due to wind pressure and dead load, and can proportion the pieces accordingly.

31. It is easy to find, by a direct graphical process, the stresses arising from a wind blowing in a direction parallel to two of the sides of a square tower such as that in fig. 22. Let that structure be framed up, and the lines of action of the wind be as there shown; letter the spaces and form the stress diagram by drawing $a'b'$ parallel and equal to ab ; $b'e'$ to bc , and so on. Commencing at the apex, we know the force $a'b'$; from the ends draw lines parallel to bf and fa ; these, measured to the same scale as the wind forces, will give the stresses in the corresponding bars. The diagram may be completed now in the usual way, taking each nucleus in the frame, and making a corresponding polygon in the stress diagram. But when we have to deal with polygonal plans, it is not possible to get so simple a

solution. The method now to be described is, perhaps, as simple and direct as we can attain. Let fig. 23 be a vertical section through the centre and two opposite angles of a framed spire of, say, eight sides, and let ab , bc , cd , and de be the

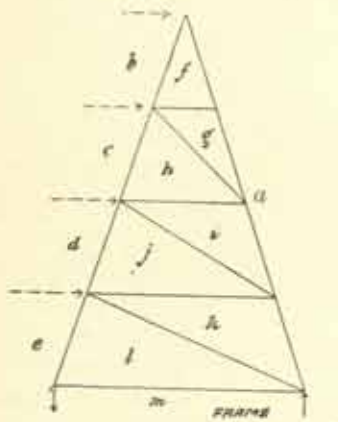


FIG. 23.

direction and points of application of the wind pressures at the various divisions. Find these amounts by multiplying the wind pressure per unit of surface by the area of the surface, the wind pressure, of course, varying with the inclination

diagram. Next produce the lines of action of the wind through these two figures.

In fig. 25 draw eo at right angles to ae , and, choosing any point p in it as a pole, connect a , b , c , d , e with p by straight lines. Through o , where the highest line of action of the wind intersects eo , draw $o1$ parallel to pd ; through 1 , draw 12 parallel to pe ; draw 23 parallel to pb , and 34 parallel to pa , producing these lines to cut eo in $o'''o''o'$. This forms the bending moment diagram.

In fig. 24, through a draw af ; through b draw gh ; through c draw ij ; through d draw kl , and through e draw eo at right angles to the force lines ae , cutting the lines of action of the wind, and so complete the shearing-force diagram.

From these we proceed to find the stresses, considering fig. 23 as a plane structure at first.

33. The point o''' in fig. 25 (obtained by producing 34 to intersection with eo) is on the line of action of the resultant of the wind pressures ab , bc , cd , de ; o'' (obtained by producing 23) is on the line of action of the resultant of ab , cd , de , and similarly o' is on the line of action of the resultant of the pressures cd and de . Draw through these points horizontal lines to cut the corresponding points o''' , o'' , o' in fig. 23. To find the stresses in the bars uv , pq , and the shearing stress to be resisted in the frame pq , uv ,

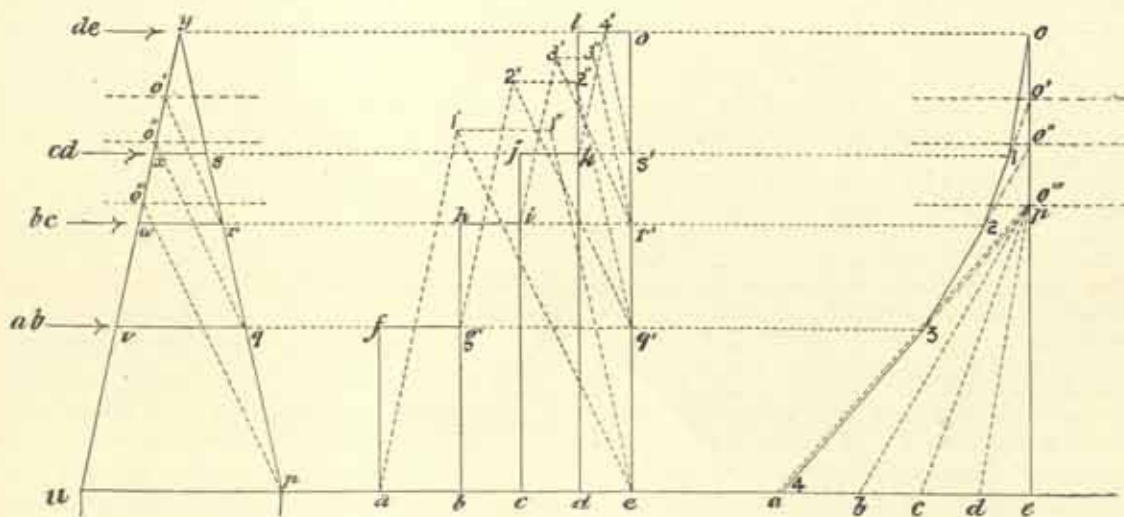


FIG. 24.

FIG. 24.

FIG. 25.

of the surface opposed to it. This would give the total wind pressure at each joint, were the surfaces at right angles to the wind; but as the surfaces are more or less "sloping" on plan, we must reduce it by multiplying by .5 for a circular figure, and by .56 for a polygon of eight sides.

32. On the base line produced, set off ab , bc , cd , de fig. 24 for the shearing force diagram, and the same again in fig. 25 for the bending moment

connect p with o''' (fig. 23), a point on the line of action of the wind pressures.

In fig. 24 the line ae represents the total shearing stress between vg and pu . Through a draw $a1'$ parallel to uv , and through e draw $e1'$ parallel to po''' in fig. 23. Draw through e the line $e1''$ parallel to pq , and $1'1''$ parallel to ae ; $1'a$ is the tension in uv , $1'1''$ the shear to be provided for by the bracing, and $1''e$ is the pres-

sure in pg . This is on the supposition that fig. 23 is a plane structure.

Similarly we proceed at the section vg ; gq' in fig. 24 being the shearing force, by drawing qo'' (fig. 23); $q'2'$ parallel to it, and $g2', 2'2'', q'2''$ parallel to vw, wr, qr , respectively.

Then $2'2''$ is the shear in the bracing, and $g2', q'2''$ the tension and thrust as before.

By the same process we arrive at the stresses and shears at the sections wv, rs .

Now the thrusts and tensions such as $g2' q'2''$ would be the stresses upon single bars; but they are resisted by several bars. In this case we are dealing with an octagon, and the maximum stress on the windward bar is $-\frac{g2'}{1.99}$, and $+\frac{q'2''}{1.99}$ on the

leeward bar, in accordance with the results previously found. Each of the stresses $a1' g2', i3', k4',$ and $e1', g'2'', r'3'', s'4'$, should therefore be divided by 1.99, and then added to or deducted from the stresses due to dead load, to find the maximum stress in the legs or angle rafters.

The shears $1'1'', 2'2'',$ &c., are similarly to be divided by (in this case where we are dealing with an octagon plan) 4.8 for the maximum shear on one face, and this result again is to be divided by the number of bracing bars (1 or 2) capable of resisting tension and compression, and increased by the ratio of its length to its horizontal extent.

34. The stresses due to wind and other irregular loading cannot be very accurately determined in the structures under discussion. It is true that if we assume that all the pieces of the frame have hinged joints—i.e. are free to turn at their ends—we can find the stresses with accuracy in the manner developed in Germany by Föppl, Hacker, and others, and by Professor R. H. Smith in England. Since writing the foregoing notes I have become acquainted with the works of these writers, the former by means of a work entitled *Calcul et Construction des Coupôles Métalliques Réticulaires*, par Pierre-Henri Brunelli, traduit de l'Italien par Désiré Mathieu, and the latter in his book called *Graphics*. But I cannot do better than quote from M. Mathieu's last chapter, written after developing in a very careful and beautiful manner the investigation of domes according to the manner of the authors mentioned above.

"Les calculs que nous avons décrits jusqu'ici

permettent de résoudre exactement le problème de la détermination des tensions dans un système répondant rigoureusement à la définition que nous avons donnée en principe, c'est-à-dire dans lequel toutes les barres sont réunies entre elles par des articulations sphériques, et où tous les axes des barres concourent exactement au centre des nœuds, etc. Inutile de dire que de tels systèmes n'existent pas.

"On sait que, par suite de la rigidité des assemblages et de leur construction imparfaite, il se produit d'autres tensions, dites secondaires, et spécialement des moments fléchissants; il existe, dans la littérature technique, un grand nombre d'études et de mémoires concernant les systèmes plans; mais on ne peut en dire autant des systèmes dans l'espace, à cause de la difficulté du sujet. Pour ce qui nous concerne, nous ne connaissons, sur cette question, qu'un mémoire de M. Hacker, et quelques autres plus ou moins vagues et hypothétiques, dus aussi à M. Hacker ainsi qu'à MM. Föppl et Müller-Breslau.

"Les études de M. Hacker se rapportent à une coupole Schwedler symétrique et symétriquement chargée; dans ces conditions, il résulte des calculs qui ont été faits, que les tensions secondaires atteignent environ 30 per cent. des tensions principales. M. Hacker, se référant au mode de variation continue que l'on a, en général, en pratique, pour des charges non symétriques, croit pouvoir conclure aussi, dans ce cas, que les tensions secondaires ne dépassent pas la même proportion de 30 per cent. M. Föppl, d'une manière plus générale, pense que les systèmes à trois dimensions se comportent, sous ce rapport, d'une manière analogue aux systèmes plans; mais il renvoie tout jugement et toute étude ultérieure au jour où d'autres questions plus urgentes et plus importantes, sur ce sujet, actuellement à l'examen, auront été résolues.

"Nous n'avons donc encore sur cette question, prise dans sa forme la plus générale, aucune donnée positive, et les hypothèses et conséquences données jusqu'à ce jour paraissent assez vagues et peu certaines."

The stresses found by the method described in this paper appear to the author as near the truth as those found by the more rigid method, and certainly involve much less labour in determining them.



Bothwell Castle : Banqueting Hall.

BOTHWELL CASTLE. By G. S. AITKEN, F.S.A.Scot.

Read before the Northern Architectural Association 9th December 1903.

NOT the least pleasant part of an architectural association's work are the visits paid to old towers and castles, a few large, others small, or it may be in some cases fragments of foundations, but all with some history of their own, and at one time the dwellings of men, women, and little children who had a larger share of the rough side of life than we are called on to experience, with as compensation a greater toughness of physical frame and density of mental faculty that enabled them to do their part amid all the hardships of the time. We like to imagine these old buildings as in their completeness, and are best pleased perhaps with some ruin that leaves much to conjecture. Many reasons may be given why we love these old ruins, the children of the dawn of architectural history in our land.

We would not care to live in them ourselves as when in their complete form ; nevertheless, we find them appealing to our sense of fitness for their purpose, and sharing with the ecclesiastical architecture of the time inspiration in design which never palls, and which will ensure sympathy so long as the buildings last. Age has garnitured the ruins with many a wildflower sprung from seed blown by the autumn breeze or dropped by some inconsiderate bird. The woods of fir, sycamore, and elm which form so fitting a setting were mere saplings, or probably not there at all, when the castle was built. Its situation was chosen only secondarily for amenity, and chiefly for security, and to be within signal of its neighbour stronghold. Some of these fortresses were the appanage of royalty ; others—and of course the greater number—were subject dwellings, many of them held by nobles or by men of lesser degree. The occupiers might be bound at one period in a common opposition and united defence against an invading foe, and at another divided among themselves, every man's hand against his neighbour.

With neither industries nor manufactures, the country only partly tilled, large areas used

as hunting grounds where still roamed the boar and the wolf and the stag, need we wonder that the peasant was a serf, and the main business of his master—strife?

And so we find the dwellings of the period to which the early part of our study belongs, built to provide against certain or uncertain attack, sentinel on outlook, drawbridge to uplift, portcullis to drop, arrow or shot-holes facing the attacking party on all sides, with machicolations above from which, unseen and protected, the besieged might aim at the swarming host below.

In this unsettled mode of life we could hardly expect to find much attention paid to art or quality of work, and yet in these two points we discover remarkable excellence in the subject of our study—Bothwell Castle.

Bothwell Castle is on the north bank of the river Clyde, about $8\frac{1}{2}$ miles south-east from Glasgow. It is founded on the Old Red Sandstone, and defended on the west and south by the steep slope that rises up from the rocky bed of the river. On the east and north is level meadow land, with here and there trees of great age. The opposite bank of the stream is covered with woods, concealing within their shade the ruins of Blantyre Priory. Bothwellhaugh, which gave name to the Hamilton who shot the Regent Moray at Linlithgow, is not far off; and further down is a bridge on the line of one of the ancient Roman highways which ran from the west end of the Hadrian Wall to the west end of the Antonine Wall. Nearer the Castle is Bothwell Bridge, the scene of the conflict between the Covenanters and the Duke of Monmouth on 22nd June 1679. Within view of the castle are Bothwell village and its church, the eastern part of the latter very interesting and dating from the end of the fourteenth century; while all around are names of places and objects associated with mediæval history.

The castle was originally of great size, with double tower entrance, great western circular tower, south-eastern and several smaller towers—numbering ten in all—connected by curtain walls and enclosing an area of nearly one acre.

All that we now see is the great western and south-eastern towers, with their connecting lofty wall, and walls extending on the east and west to a later one, which running west to east reduces the area to two-thirds of its original extent. Within this restricted space are the chapel and hall, with indications of other buildings long since removed.

North of this enclosure are the foundations of the great entrance and of four other towers, and within the ruined area is a grove of elm, sycamore, and beeches, many of them stately trees, two of the beeches having their trunks four feet, and a third five feet, in diameter at the height of a man from the ground.

At one time, the lower part of the curtain was covered on the outside with ivy, which, however picturesque, is no friend to old walls, as may be seen on comparing the honey-combed masonry it concealed while growing, with the smooth surface of the wall above. It is necessary to take the corroding effect of this removed ivy into account if we would avoid the mistake of assigning it an antiquity it is not entitled to.

In years gone by visitors imagined that the southern section comprised the whole of the ancient castle; but it happened in the year 1888 that an old plan, showing buildings beyond the visible ruins, was discovered in the library of Bothwell House, and on an effort being made by the Earl of Home, the proprietor, to trace out by excavation its original extent, the interesting barbican towers and relating curtain walls were disclosed.

The earlier part of Bothwell Castle is the great circular western tower which, while erected as part of a future complete scheme, was originally made a fortalice, entire in itself, defended on one side by a moat with a postern door to the south. The door, being at some height from the ground outside, must have been approached by a flight of steps: it is in two

orders, the outer having a segmental head, the inner a horizontal chamfered lintel, each end carried on jamb corbels and forming a tympanum above. The soffit of the outer order next to the tympanum has a slit about 12 inches broad, continued upwards to what is very like a fireplace recess in a guard-chamber, through which missiles could be discharged on any presuming assailant. There has been no portcullis, and the entrance has been further defended by three loopholes in the adjoining round tower. This tower is to the west of the door and of three stories in height. The lower story may have been a prison; the first floor has an entrance from the court with corbels supporting the lintel, the converse in outline of those at the postern door. On the west side of the tower are

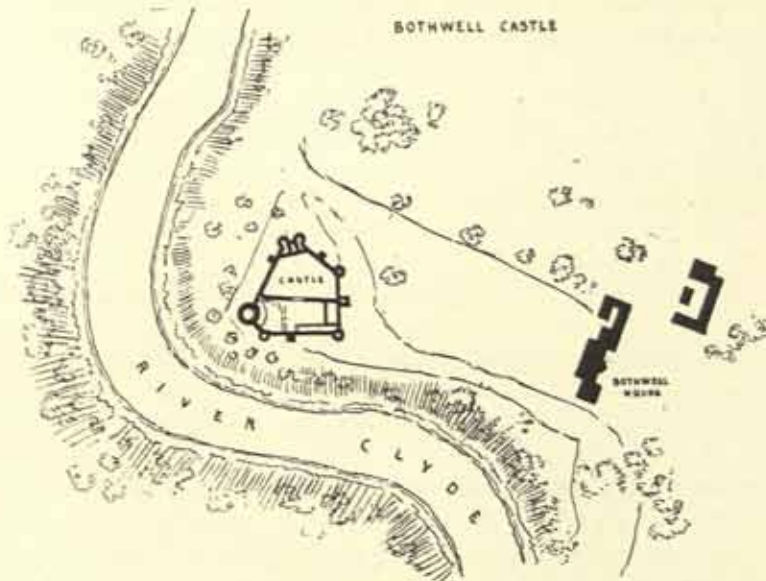


FIG. 1.

been a prison; the first floor has an entrance from the court with corbels supporting the lintel, the converse in outline of those at the postern door. On the west side of the tower are passages from each floor leading through the thickness of the wall to the great western tower, and a passage on the other side to the guard-room referred to. This guard-room had also an external stone stair, supported partly on an arch the outline of which is still visible in the wall. Immediately above the guard-room is a bartizan, which continues on the same level some distance eastward, and was carried internally on heavy corbelling which formed machicolations for defence against any assailant getting inside.

Still further east from the guard-room is a higher level of masonry with a turnpike stair at the end leading to a tower that projects on the exterior of the castle wall. This tower was approached from the guard-chamber, and must

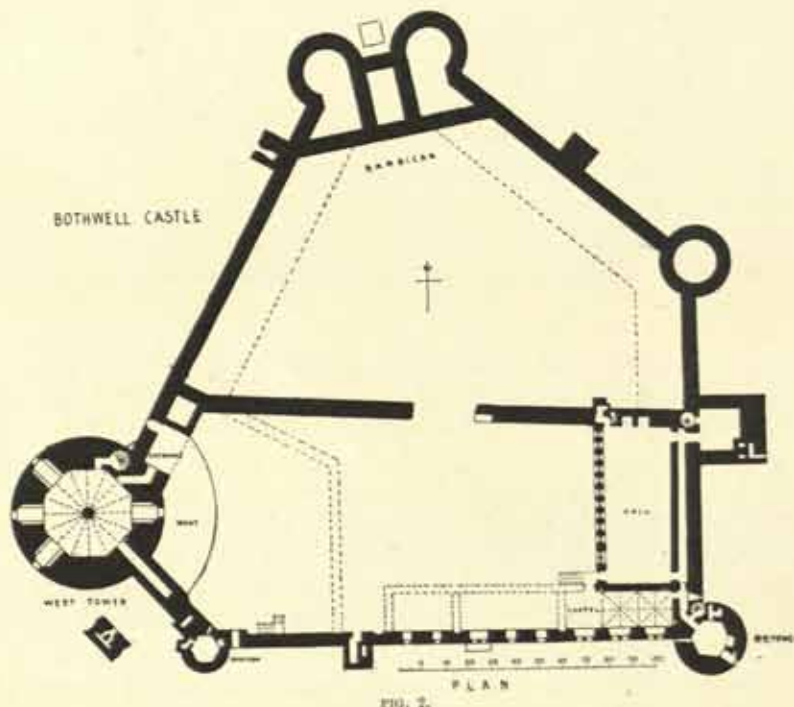


FIG. 2.

have formed part of the scheme for defending the postern door. It had its garde-robe down the middle, ending in a dry pit below the level of the court, with an entrance to it on the court level. The circular tower has its garde-robe on the side next the river, projecting on corbels at two different levels and discharging outside.

The arrangement of the tower and passages described, which extended due east and west, about 90 feet in all, is connected with the circular main tower by a curtain wall which trends north-westward nearly 30 feet before it joins the tower, and following an approximate angle of 45° . It is four stories in height altogether.

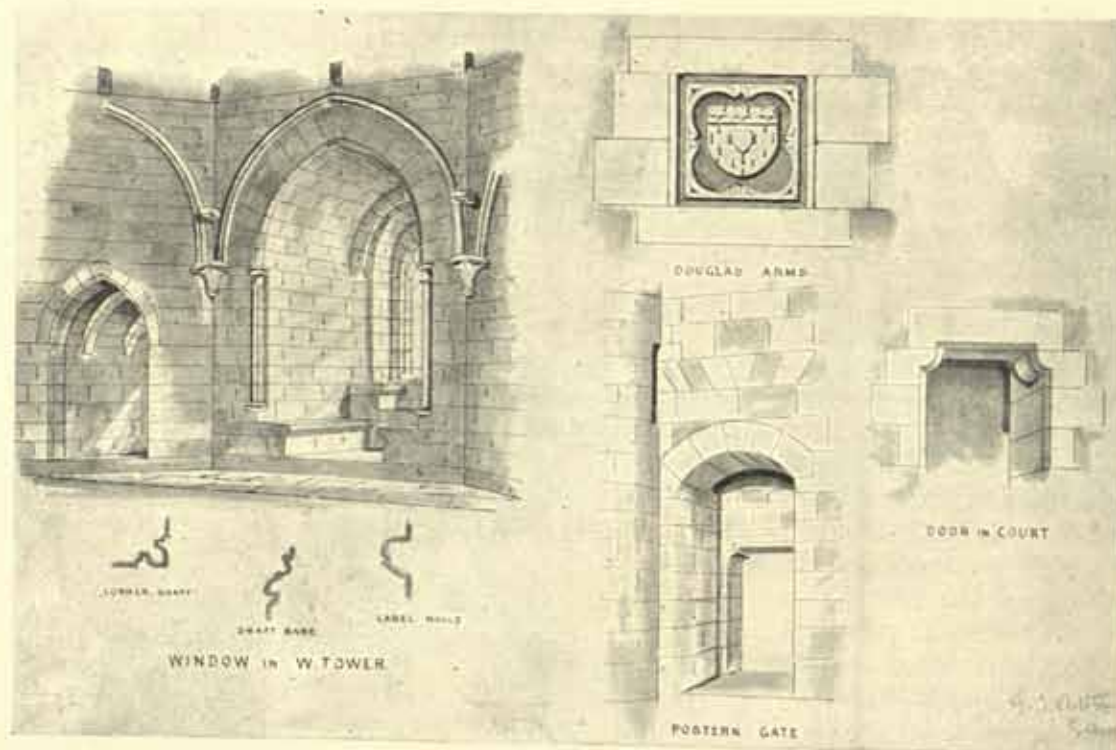


FIG. 3.

Crossing the inner bailey from the postern, we reach the entrance to the tower, which is on the north-east side of it. For its protection there was originally a drawbridge wrought by chains from a vaulted room over the entrance. Further protection was afforded by a portcullis a short distance within, which descended from the same chamber. The passage which it defended deflected from the entrance so as to cause it to open into the tower in the centre of one of its internal octagonal sides. It is heavily and picturesquely groined. The entrance has on the outside a special construction of square masonry projecting from the curve of the tower, thus forming a better working surface for the drawbridge, and also serving to turn the entrance towards the curtain wall and away from the open bailey. The door was protected above in the usual manner by a machicolated parapet at the summit of the tower.

The great tower to which the door gives entrance is 65 feet diameter externally, and octagonal inside, with walls 15 feet thick. At present the western half of the tower is entirely gone, the eastern half having been formed into a series of later rooms by a cross wall made

most probably of the material of the demolished western part, with its own windows and fireplaces.

Originally the tower was a magnificent piece of construction, approaching 100 feet high, in four stories. The lower story contains the well, with its parapet and alcoved semi-circular head with "stoup" recess on one side finished with a pointed head. There are a few courses of an octagonal pillar, 5 feet in diameter, of solidly built masonry with a splayed base, standing in the centre of the octagon, and placed with its angles opposite the centre of each side: it does not seem to have gone any higher than the well chamber, and, if we may infer from the springer stone over the well, has been built to receive a segmental arch corresponding with one on the opposite side of the pillar, which would sustain the beams of the wood floor above. There are no indications of vaulting on this level. The descent to this chamber is from a turnpike stair to the right of the porteullis entrance.

The well chamber may have been lit by windows on the demolished west side of the tower, which would, of course, have to be near the ceiling in order to be beyond the reach of assailants. There is no window on the inner side next the court.

The principal chamber, which is immediately above the well room, has a very fine window on the side next the court in a deep recess, of the form usual in castles, with seats at each side. It far surpasses anything of a similar kind in Scotland for the excellence of its masonry and beauty of architectural detail. It is framed off on the side next the hall by shafted and moulded angles, having bases and the remains of carved capitals from which spring chamfered arches: these arches have beyond them moulded wall ribs which start from carved corbels in each angle of the octagonal hall. The window recess is vaulted over by ashlar which continues vertically down to stone seats at each side, and the ashlar curves inwards on plan to a single-light cusp-headed window.

On the vertical sides of this window recess are forty-one different masons' marks. What purpose masons' marks served has not been determined: they are certainly very ancient, having been found on Egyptian masonry. Some writers have supposed them to be symbolic, others that they were put on the stones to show whose work they were, and how much the workmen were entitled to receive in payment. In some stones one mark has been added to the main symbol, either to distinguish the member of the family using the same sign or as the mark of the overseer added to that of the workman.

I would suggest, however, from examination of the special bay at Bothwell that, while the marks might be the property of particular masons, they also served the purpose of indicating the intended position of each stone in the building; that the master mason, in short, as any modern clerk of works would do, plotted the various courses of masonry, marking



on his drawing the symbol of each man to be engaged upon them, and allotting in this way to every hewer his work, which readily found its place in the building on reference to the master mason's original draft.

The mark *may* also have been intended to aid in settling the amount of money that fell to each, and at the same time assigning to the individual mason the credit due him for workmanship. At any rate they serve a useful purpose to the modern investigator; for, although they may not determine the date of work, they show by their difference from marks in other

parts of the castle, that independent sets of workmen were engaged at these various parts.

In the meantime let me state that of the forty-one different marks I noticed one, the pentacle, which corresponds with marks at Malmesbury (Norman), Furness (twelfth century), Gloucester (eleventh and fourteenth centuries), Canterbury (Norman), and also at the small chapel on the cliff at St. Andrews. Another mark—the N—is found also in the Early English crypt of York Minster.

There would no doubt be other three similar window recesses on the destroyed sides of the octagon which must have afforded a remarkably fine view of the river on either hand.

Although the wall ribs and the corbels from which they spring are suggestive of vaulting rising to a crown and then descending to a central pillar, after the manner of Lincoln or Salisbury Cathedral chapter houses, we regret to say, on examining the parts in detail,

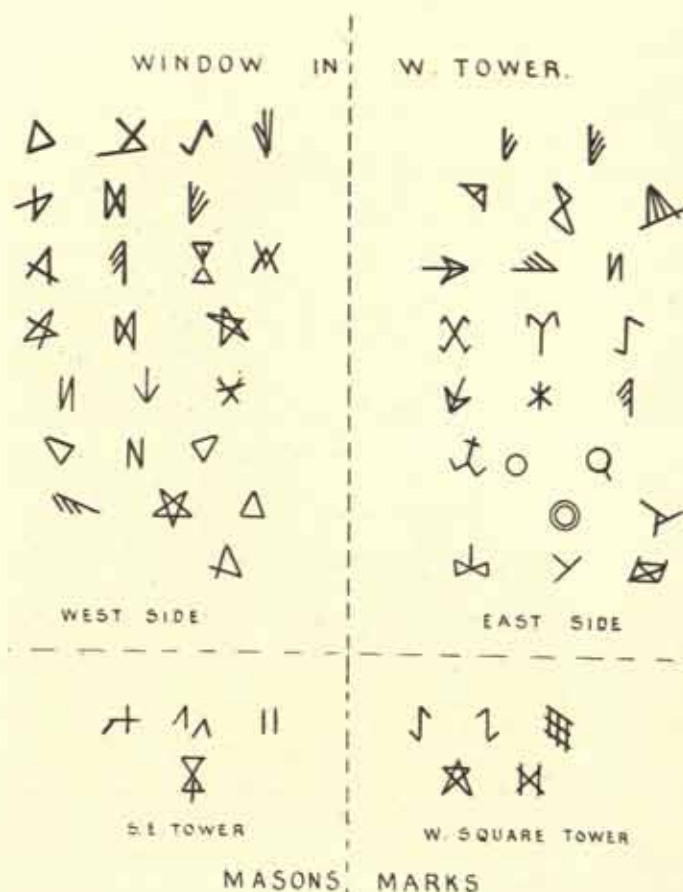


FIG. 5.

that no roof so beautiful and monumental covered this fine hall. There are no indications of springers rising from the corbels, and the wall ribs are not square on the extrados, as they would have been were the usual "filling-in" resting upon them; they are simply label moulds.

The floor above, like that over the well chamber, has been of wood resting on beams, the holes for which occur immediately over the points of the label moulds; others also are situated at the same hall in the angles of the octagon.

Plain corbels occur in the angles—about 2 feet—above the carved corbels which most probably supported verticals and struts rising to the angle beams overhead.

In the two top floors there is a vertical slot in each angle and in the centre of each side, extending downwards about 6 feet from each ceiling, with wall holes at the top of them: these grooves or slots were apparently intended to receive vertical timbers from which struts would

spring at the bottom, sloping up to the beams which partly rested on the verticals, passing over them to the holes in the wall behind. If there were corresponding struts springing from a central wood pillar the construction must have been very effective.

The second floor has no window next the court; the third floor has, and it is a two-light cusp-headed window of the Early English period.

The stair, which began at the ground floor, continued to the bartisan, serving each of these chambers on its way; and there were also scale stairs in the thickness of the wall about 3 feet wide; like those at Conisbrough Castle. One of them may be seen in the sectional masonry of the tower on the north side overlooking the river.

A wall runs north-east from the great tower at a somewhat similar angle to that of the south-east wall, but only the lower part is original; the vertical junction between the earlier and later occurs very near the tower. But whether what is known as the water-gate at the bottom of it opening into the moat is ancient is difficult to say; the jambs may be old, but the lintel must have been restored at the time the upper wall was rebuilt. The water-gate has a vertical groove on the inside of the northern jamb, probably for a sluice gate, to allow the water of the moat to be emptied.

The south-east tower though lofty is only large enough in area to provide one room on each of the floors, which are four in number: none of them have been vaulted; they form in plan a hexagon about 15 feet in diameter. There are none of the indications of defence we find at the great western tower: the basement is entered on the ground level by an ordinary door, but there is no stair inside communicating between it and the floor above, so that it is a puzzle how the first floor was reached. Most probably the stair went up along the east curtain wall and then led through the opening piercing the buttressed projection that stands at right angles to the east curtain, and through which is the present access to the banqueting hall.

From the first floor of the tower a special stair ascends in the thickness of the wall to the summit, giving entrance to each floor. The rooms have canopied fireplaces, that to the first floor having a plain moulding on the jambs and lintel; the second floor mantel has shafts, caps, and bases on the jambs; that of the upper floor, still more elaborate, has a series of grouped shafts on the jambs; the lintels of both these two latter fireplaces are unfortunately broken. The upper room is arcaded in stone all round, there being one semicircular arch to every side of the hexagon. Each room has one window that looks south-eastwards towards the river—the most inaccessible side of the castle—and there is no window to the east except in the top floor. The first floor has also a narrow loophole which commands the whole south curtain wall of the castle.



FIG. 8.—SOUTH-EAST VIEW

The east end of the chapel abuts partly against the south-eastern tower and partly against the east curtain wall, and has been the last of a series of apartments which extended along the south curtain wall as far as the east wall of the inner bailey. A gable tangential with the western side of the south-eastern tower has been erected at the eastern end of the chapel, supported below on a series of arches, one springer of which remains on the north wall. The space between this gable and the east curtain formed a passage leading from the tower to the opening through the buttressed wall already referred to, and was roofed over by a "lean-to" resting on a stone gutter built into the curtain. The skew moulds of this roof are still in evidence on the north and south. This passage was lit by a window in the east curtain. The entrance to the chapel was at the north end of the gable: its north jamb still remains.

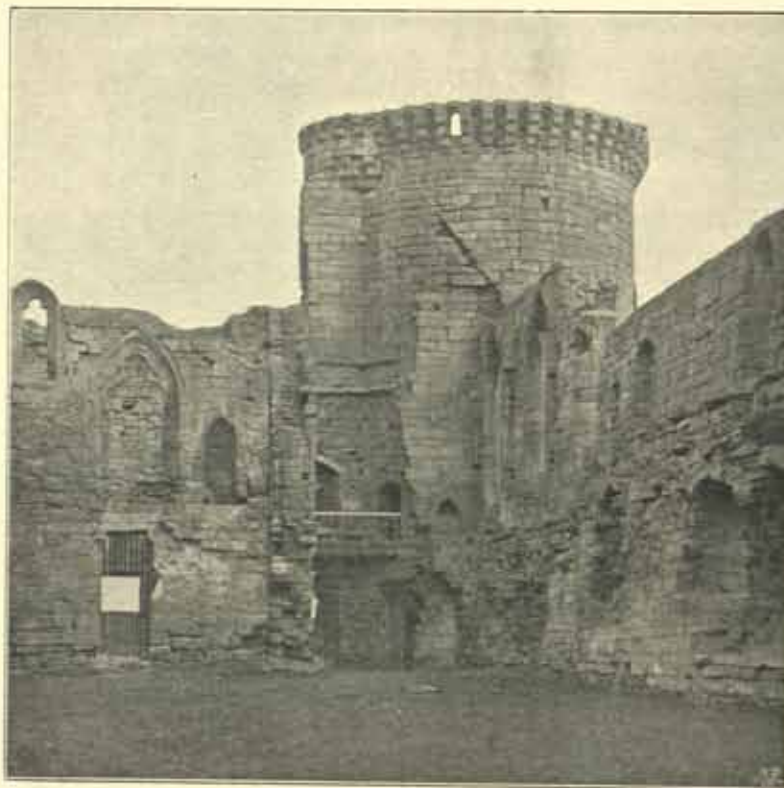


FIG. 7.—CHAPEL AND SOUTH-EAST TOWER.

The chapel has been in three bays, lit on the south side by three windows divided each into two lights by mullions. The floors of it and of the entire range of southern buildings have rested on wood beams, as may be seen from the corbels still existing. A stone seat occurs along the south side of the chapel, rising at the altar end to form a sedilia for the officiating priests, who, we may suppose, had their abode in the south-eastern tower. Luxurious accommodation surely, but then both during the time of the founders and their successors the clergy would

be men in high position in the Church. Two of the chapel windows have one of their lights continued to near the floor, so that anyone could sit there and enjoy the prospect.

In the south end of the gable is the piscina, the basin of it discharging into a large cavity about 18 inches diameter with no outlet; the jambs have shaftlets with moulded caps and bases, and the soffit has a pointed segmental moulded archlet: the back is recessed with two pointed panels cusped in the head.

The north wall of the chapel is plain, and is a continuation westward of the buttressed wall referred to; the severance between it and the buttressed wall determines the date of the chapel to be subsequent to that of the south-east tower, and this is confirmed by the appearance of the exterior masonry of the south wall, which shows it to be distinctly later than that of the tower.

A double aumbry occurs at the east end of the north wall, and the remains of a holy-

water basin at the west end next to the general entrance to the chapel. The approach to this door must have been by an outside stair. There was an external door immediately below this opening into apartments underneath the chapel, which were lit on the south by three small windows close to the ceiling. There does not appear to have been any west wall to the chapel, no sign of the junction of any cross wall occurring at this point.

The chapel has been groined over the two eastmost bays with quadripartite vaults; the springers are all there, the two eastern ones resting on single shafts, the others on triple shafts longer than the eastern, and like them resting on corbels; the capitals have all been carved.

The westmost bay has a large moulded corbel immediately to the west of and level with the groin capital, and above it a square hole. On the same level at the spring of the east arch of the west window is a corresponding hole, and about four feet below these two are other two sinkings. Three exactly similar holes exist at corresponding levels in the north wall; the fourth has been broken away. The purpose of these holes has been to receive beams which either formed a gallery for the rood or for officiating minstrels on feast days. The bay over these has not been groined; the south springer of the west groined bay was cut through the middle vertically and finished with an ashlar surface next to the rood beams. This of course confirms the former statement that there had been no west wall to the chapel.

The absence of any west wall suggests that the room to the west was used as a nave, separated from the choir by a screen under the rood: it has three transomed and mullioned windows with seats in the bays, and also a stone seat along the wall like that in the chapel. There is a curious gate recess in the south wall near the screen and another at the west end.

The room under this on the ground floor seems to have been a very important one: it has two transomed and mullioned windows with seats in the bay easily accessible from the floor. The westmost of these windows has two stone corbels on the outside of the wall. It is likely that these corbels supported some kind of balcony commanding a view of the river with a canopy overhead, the window serving as an access to it.

There are two less important rooms on the same level, further west, lit by plainer and smaller windows close to the ceiling. At the extreme west is another gate recess which indicates this part as the western end of the south range of building.

There is a room under the chapel entered from an external door under the west entrance to the chapel, lit by three small windows in the south wall close to the ceiling.

The banqueting hall extends from the north wall of the chapel to a late north curtain wall: its eastern wall is separated from the east curtain by a space of about three feet at



FIG. 8.—NORTH WALL OF CHAPEL

its south end, diminishing to 18 inches at the north end. It has been surmised that the passage or space on the east was intended for a means of escape in emergency; but this cannot have been its purpose, as although there is access to it at the south end there is no egress at the north. The likelihood is that the interval was due to the need for providing an eaves gutter for the east slope of the hall roof, the bottom of which was much lower than the summit of the curtain. Neither the east nor the west walls of the hall bond into the north and south: this suggests that the hall is later than the adjoining work.

The present floor of the hall is about 12 feet above the court level, and rests on three vaults entered by as many different doors from the court, each cellar lit by a narrow window opening into the narrow passage at the east side of the hall. The centre cellar has, besides,

a square opening over its door head, which is semicircular; and no doubt the other two doors which have lost their finished masonry were treated in the same way. These vaults with the floor over them are of a date subsequent to the erection of the hall. Assuming them to be away, we see a hall 60 feet long by 30 wide, with a height of about 30 feet from the floor to the wall head, lit on the west side by a very fine range of ten single-light windows having blunt cusped heads, the reveals being the same depth outside and in.

This height of 30 feet is so considerable as to suggest an arrangement like that of the banqueting hall at Linlithgow palace, with galleries at the sides and south end approached by the doors at each end high up

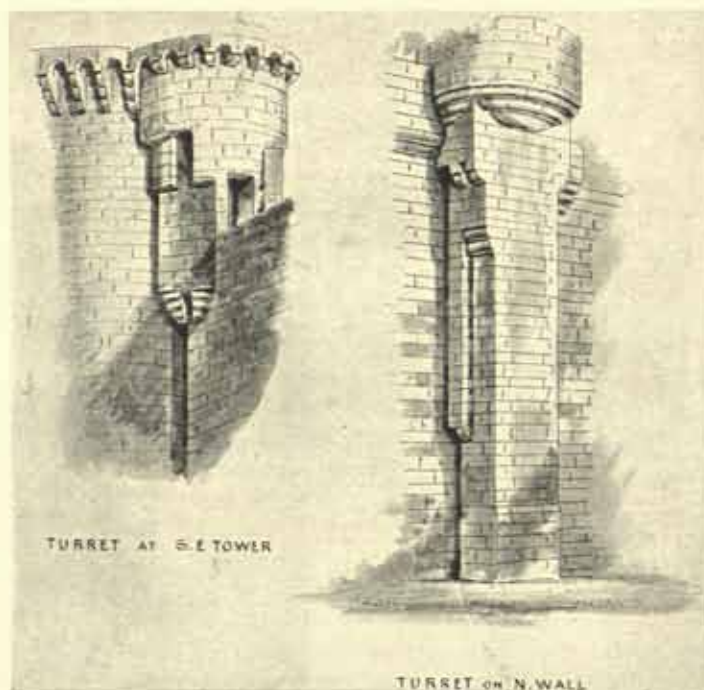


FIG. 9.

in the west wall, and also by a door in the north of the east wall, and probably also by another at the south end of the same side, where the hall is now entered from the chapel passage.

Besides the range of clerestory lights there is a richly moulded two-light window with traceried head to the south of them. So fine a window suggests that the gallery thus lit was occupied by the residents of the south-east tower, or it may have been used as a minstrels' gallery. The side galleries might be used by spectators of the proceedings in the assembly below, and these we may reasonably suppose from the high position of the occupants of the castle would be often men of great importance. In addition to the clerestory lights there would probably be windows below the west gallery where the later masonry of the three doors and adjacent masonry occur.

The stair to the general entrance of the chapel would form an approach to the doors of the end gallery, and most likely the door at the north end of the same wall was reached in a similar manner, or had some relation to a passage of communication with a range of buildings that was formed to the west of the hall against the north curtain wall. There are the remains

of a large fireplace and flue at the western extremity of this wall which point to such a series of rooms, possibly a kitchen and its adjuncts. There is a garde-robe at the north-west corner of the hall, and a staircase which forms a very picturesque projection on the outside of the north wall.

The hall mantel so far resembles that of Linlithgow in being planned with a double recess—Linlithgow is triple. It has plain chamfered jambs and lintel, the latter supported on flush corbels without any hood. On the central pier is a rough empty sinking, with a shaftlet at the bottom, which most likely carried a coat of arms or group of sculpture.

There is some very interesting masonry in the curtain wall at the north-eastern corner of the hall in connection with a drawbridge which belonged to a square tower now unfortunately in ruins. The bridge opened into the court before the hall was built, was worked by a counterpoise and chains, and must have spanned a space between the tower and a flight of steps. Of course when the bridge was drawn up the steps were useless. The bridge was removed when the hall was erected, but the tower door was retained. The tower was evidently an independent habitation for some of the retainers, forming a series of stories approached by a spiral stair still remaining on its west side. It was accessible also along the top of the east curtain wall through a door which opens out of the circular stair in the south-eastern tower.

The details of the barbican and of the other northern parts of the castle are only matters of conjecture. Curtain walls ran on the east from the tower just referred to, and from the great western tower to the barbican; that on the east broken on its way by a circular tower of a diameter similar to that on the south-east, and further on by a square tower balanced by a corresponding one on the west curtain.

Of the complete appearance of the barbican we may be able to form an idea by studying any of the French examples, such as the Châteaux des Langeais, Villebon, and Chaumont, or Caerlaverock Castle nearer home.

In these instances we see an entrance between twin towers, with porteullis and draw-bridge, defended above and on the flanks in the usual manner. In the case of Bothwell the bridge spanned a deep pit, not necessarily filled with water.

The first recorded owner of the barony of Bothwell was Walter Olifard, who held the position of Justiciary of Lothian in the reign of Alexander III. The Olifards probably came over from France with William the Conqueror. They were settled first in England in the county of Northamptonshire, and were close friends of David, Earl of Huntingdon (afterwards David I. of Scotland), who was living in the neighbourhood. Olifard followed David to Scotland, and was rewarded with lands in Roxburghshire, out of which he gave a grant to Dryburgh Abbey.

It is unnecessary for our purpose to follow the history of the Olifards further than

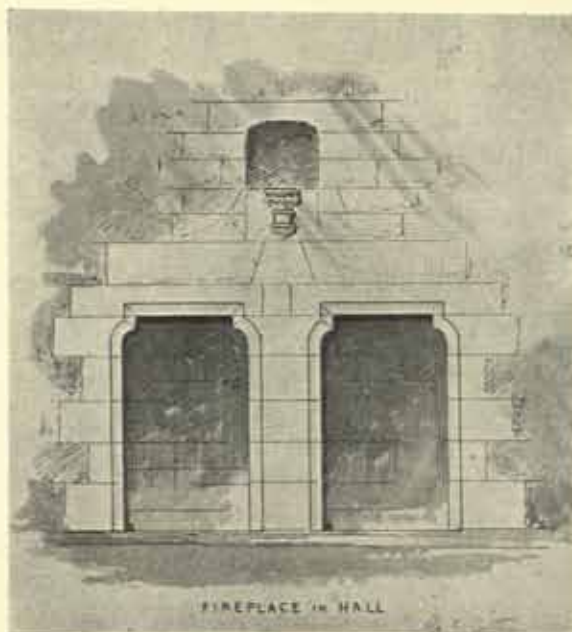


FIG. 10.

to say that it was a Sir William Olifard who as Constable of Stirling Castle so gallantly defended it against Edward I. in 1304, and afterwards was one of the signatories to the famous remonstrance sent to the Pope from Arbroath Abbey in 1320. The family in course of time held possessions in Perthshire, and their descendants are now known as the Oliphants of Gask.

By Walter Olifard's eminent position as Justiciary of the Lothians he would have facilities for getting the high class of masons that were engaged on the castle. By his time the Norman method of square tower building had given place to one where the round tower was in use.

It seems unnecessary to suppose that this form of tower was copied from anything across the Channel. The circular tower was already in existence at Abernethy and Brechin in Scotland, in Little Saxham Church, Suffolk, and on a larger scale in some of the Roman fortifications in this country; and it might well have occurred to architects and military engineers of that time that a round tower was better fitted for defence than a square one, which had corners that could be undermined.

After the death of Alexander III. (1292) the barony passed by marriage to the important family of Moray, and was possessed by Sir William Moray, Panetarius, or Chief Butler, of Scotland, who died when on parole in an English prison in the year 1300.

Prior to this date Edward I. took the castle and held it with an English garrison under Stephen Bampton. The Scots retook it by assault after a tedious siege of fourteen months, when by that time most of the garrison were slain, and the survivors at the point of starvation. The victors held it till September 1301, when Edward himself invested it with a large force and obliged them to capitulate. Here he lived from the 17th to the 20th September 1301. Edward then granted the castle and barony to the famous English commander Aymer de Valence, after whom the great circular tower was named the "Valence Tower."

The castle remained in the custody of the English force till 1306, and may at that date have passed to the Scots as the rightful owners; but it must have been under the control of the English again in 1309, as de Valence fled here after his defeat at Loudon Hill; and it was certainly in the hands of the English in 1314 under Sir William FitzGilbert, ancestor of the Hamilton family, for he was able to receive the Earl of Hertford and fifty of his men after their defeat at Bannockburn. Not long after, however, Sir Edward Bruce besieged the castle and compelled the English garrison to surrender.

After the battle of Halidon Hill in 1333, when Scotland was overrun by the English army under Edward III., it fell again into alien hands, and the King himself lived there from 18th November to 26th December 1336; and it is on record that he issued in that year fifteen writs from the castle. In 1337 it was retaken by Sir Andrew Moray, and was then dismantled.

Sir Andrew married Christian Bruce, the sister of Robert the Bruce, and was restored to the house of his fathers by the King under the title of Lord Bothwell. He had two sons, Sir John and Sir Thomas: the elder died without issue, and the widow (Joanna) of the younger son, Sir Thomas, married in July 1361 Archibald, usually known, from his grave countenance, as "The Grim," and so in that way the castle passed from the Morays to the powerful family of the Douglasses on the death of Sir Andrew in 1388.

Archibald assumed the arms of the Bothwell house and took the castle for his residence, inserting his arms high over the postern gate. He was created Earl Douglas in that year by King Robert II., who to the honour of the title added the substantial gift of the Douglas estates in Lanarkshire. Archibald died at Thrieve Castle 3rd February 1401, in the seventieth year of his age, and was buried at Bothwell Chapel, which he had founded in 1398. Archibald's descendants—usually known as the Black Douglasses—held the castle until at

length, after several changes of ownership, it came into the hands of the Red Douglasses. One of them was raised by Charles I. to the marquissate of Douglas, and as a Catholic, was opposed by the Covenanters, who captured his possessions of Tantallon and Douglas Castles. One of his grandsons, Archibald, got a new patent, after the restoration of Charles II., creating him Earl of Forfar in 1661. Under that title he in 1669 is referred to as the builder of Bothwell House, which adjoins the castle, using for that purpose part of the castle masonry.

A change had by this time come over Scottish domestic architecture. The plan arrangements all along from the thirteenth century had agreed with those of England. The English manor houses date from the sixteenth century, and Scotland began to change its domestic architecture at the same period. As the country became settled and prosperous the retainers, who lived within the precincts of the castle, now began to occupy houses of their own; artificers, such as smiths and carpenters, hitherto in the service of the lord of the estate, were no longer wanted in that capacity, and therefore transferred their occupations to the neighbouring villages, and with the advancement of the menial occupants of the castle generally, and also of the lord and his friends, better accommodation was required, and a greater variety of apartments needed, libraries among the rest.

The introduction of gunpowder made the old fortifications useless, and although some of the buildings, such as Crichton Castle in Midlothian, might present a forbidding aspect on the exterior, their courtyards were ornamented with faceted masonry or moulded work of various forms.

When the Renaissance came to Scotland, as it did earlier than into England, the form of domestic plan entirely changed; hitherto it had been four-square, open in the centre; an arrangement which, though beautiful in the East, with fountain and tropical garden, was hardly suitable to the latitude of North Europe. This open area was now covered in; the staircase made a fine feature of; the forms of the doors and windows became more varied, chimneys were made prominent, resembling the Elizabethan forms in their spiral detail. Rich plaster ceilings took the place of the painted wooden ones, and tapestry and wainscoting were extensively used. Mantelpieces, important hitherto, were still a conspicuous part of the house, reflecting the characteristic hospitality of the people, but formed now of finer and softer material, such as marbles and rich woods.

Such a plan as that of Bothwell Castle, with its detached buildings, inconvenient domestic apartments, its principal rooms still stately, but reminiscent of planning for defence, and its other points of objection too numerous to mention, would compel the resident family to follow the spirit of the time and erect a house elsewhere if the castle was unfit for adaptation.

This step was taken in the seventeenth century by Archibald Douglas, as we have mentioned. There can be no doubt that till that time he was in occupancy of the castle, living very likely in the south-eastern tower, with its adjacent apartments on the south side facing the river, retaining the chapel for domestic use, after the Presbyterian form of worship.

It was probably he who altered the fine hall by the erection of the three great cellars for storage underneath, planting the grove of trees now so stately on the northern part of the castle site to cover the devastation made by the removal of that part of the fortalice for the purpose of building the new south wing of Bothwell House. The wing of the house is plain and solid, and, as compared with the ancient castle which it supersedes, prosaic in architecture externally, but more than compensating for the inferiority by its internal comfort and the beauty of its plaster ceilings.

The Earl, with no fear of siege before his eyes, has so placed it as to command very charming views on its south, east, and west sides.

Whether it was intended to be a complete building as it was at that date, we cannot, of course, say; but Earl Archibald was content with it for the space of about half a century, dying in 1712. His son, the second Earl of Forfar, only survived him three years, passing away at Stirling of wounds received at the battle of Sheriffmuir in 1715. Monuments to both father and son were erected in Bothwell village church by the widow of Archibald. She continued to live in the modern house till her death there in 1741.

A Stewart succeeded to the estate, and was created Baron Douglas 8th July 1780. Following the fashions of the time in which James Gibbs and the Adams played so large a part, he resolved to extend Bothwell House, erected more than a century before, and engaged a London architect—James Playfair, the father of W. H. Playfair, afterwards an eminent Edinburgh architect—to erect what is now the centre of the mansion, adding a northern wing to balance the original house, which thus became a southern wing. Among the sketches prepared by James Playfair was one that provided for a colonnade on the east of the centre side, and continued in the form of quadrants to the wings—a very common arrangement at that time. But this fine scheme was not adopted.

A very good marble mantel by Westmacott, the father of Sir Richard Westmacott, is in the dining-room. The extension appears to have occupied in erection from 1785 to 1789. It may be of interest to mention that it was in Bothwell House, in 1808, that Sir Walter Scott wrote *Young Lochinvar*, and had the pleasure of reading it to an audience, among whom were Lady Dalkeith and Lady Douglas.

Baron Douglas also began to build a new castle at Douglas after a design by William Adam, which appears in the *Vitruvius Scoticus*, and is evidently with its round towers inspired by the ancient Bothwell Castle.

Baron Douglas died 26th December 1827 at the advanced age of eighty-one years. His elder granddaughter married Cospatrik, the eleventh Earl of Home, who was created Baron Douglas in 1875. Through this connection Bothwell House and Castle were transferred to the Home family, now represented by Charles Alexander, twelfth Earl of Home and second Baron Douglas of the new creation.



Bothwell Castle.

NOTES ON THE PLENUM SYSTEM OF VENTILATION.

By WILLIAM HENMAN [F.].

IN the Paper which I read last December on the Royal Victoria Hospital, Belfast,* I particularly stated it was not my desire to raise controversy on the subject of mechanical *versus* natural means for securing ventilation; yet, as members then present expressed the opinion that it might with advantage be further discussed, the Council of the Institute have appointed the 6th of June for that purpose.† If the time then at our disposal is to be well employed, the subject of ventilation generally must be dealt with on practical and scientific lines; and as that was not attempted in the Paper to which I have referred I venture to suggest some reasons which tend to show that plenum ventilation can be beneficially employed in certain buildings, and ought to be more closely studied by members of the architectural profession.

A primary necessity is to arrive at a concisely correct definition of what should be understood by the term "efficient ventilation" when applied to occupied buildings. Apart from outside contaminating influences which would affect ventilation by whatever means obtained, I suggest it is "continuous change of air within a building without causing discomfort or adversely affecting the health of the occupants."

The province of an architect in connection therewith is to dispose buildings on the ground, construct and equip them, so that the available air may be supplied in ample quantities, freed from suspended impurities, tempered and regulated to requirements without deterioration.

Buildings are erected principally to secure greater comfort than can at all times be obtained in the open.

By the erection of buildings, movement of air within them is necessarily less than it would be over the unoccupied site.

Change of air within a building is principally brought about by an ascertainable force—either of propulsion or extraction—although the law of diffusion—i.e. the process which brings about intimate mixture of gases without chemical combination—is a serviceable but less powerful agent in connection with ventilation.

If these premises be accepted, the question which has to be discussed is not whether by plenum ventilation a condition within doors can be secured equal to the open air at its best, but

whether it can be employed in certain buildings, suitably constructed, so as to obtain at reasonable cost more constant and efficient ventilation than can be secured by other means.

A great hindrance to the proper comprehension of this subject is the employment of unscientific terms such as "artificial ventilation," "automatic ventilation," "natural ventilation," "mechanical ventilation," because they prejudice the mind. Ventilation is a result brought about either by natural or mechanical force. Moved by either, air is the same, just as water is the same, whether allowed to flow naturally or forced on by mechanism. Water may become fouled on its way, so may air, whether it pass in naturally or is propelled in its course from the outside to the inside of a building; but it does not in the least follow that fouling results from the power which caused its movement.

It is scientifically wrong to refer to a fire causing a "suctional" influence in a flue, for it does nothing of the kind. Air when heated expands and is specifically lighter than an equal volume of colder air; it is the latter descending by the force of gravitation which propels the warmer air upwards; consequently an open fire in a room causes change of air by propulsion; moreover, the propelling force of wind is far greater than the suctional influence it exerts upon air within buildings. By realising these facts it is easy to understand that "plenum" ventilation is more in accord with nature's methods than "exhaust" ventilation.

Notwithstanding the acknowledged extravagance of, the dust and dirt resulting from, and the unpleasant draughts at times set up by, the open fire, I for one appreciate its cheerfulness, and believe it will long hold an honoured place in the British home. The mere fact that it necessitates an upcast flue is of the greatest service in connection with ventilation; but as the area of an ordinary smoke flue at the chimney-pot end does not greatly exceed half a superficial foot, the volume of air which can pass through it in a given time is limited, as is also the heating power of a single fire-grate. Consequently, for larger apartments two or more fires are required, and it is well known that unless an adequate supply of air be otherwise provided, smoke will at times be drawn down one or other of the flues. For this and other reasons hot water, steam, air heated by stoves or electricity, are used, none of which demand an upcast flue or flues from the apartment to be warmed thereby. Yet for the health

* JOURNAL R.I.B.A., 19 Dec. 1903.

† For the purposes of the discussion reported *infra*, the author's unrevised draft of this Paper was issued to members with the last number of the JOURNAL.

and comfort of occupants, change of air is a necessity, and can only be brought about by providing suitable inlets and outlets. This is a simple statement of fact of the utmost importance in connection with ventilation, yet too often neglected, resulting doubtless from difficulty in determining the positions, dimensions, and construction of such openings, and I incline to the belief that strong advocates of what they term "natural ventilation" are of the *laissez faire* order who expect nature to do everything for them; and as they do not consider whence the wind cometh nor whither it goeth, they provide neither suitable entry nor exit for it in the construction of buildings.

With regard to the possibilities and difficulties of ventilating an apartment warmed by other means than open fires, say a church or assembly room. Suppose it is a calm frosty day, with the temperature inside several degrees higher than it is outside. If inlet-openings are provided at or near the floor level and outlets at or near the ceiling level, a steady flow of air will take place from the inlets to the outlets proportionate to the difference between the internal and external temperature, and to the relative sizes and positions of the openings, brought about simply by the propelling force of the colder air outside falling by gravitation; but it does not follow that ventilation will be "efficient" even if the openings are adequate and well placed, because the differences in temperature may not suffice to cause adequate change of air—the opening of a door or window will upset the relative proportions between inlets and outlets, probably causing draughts. Moreover with a number of people seated on the floor area, and with air entering around the lower portion of the walls, it can only arrive at those in the centre after becoming fouled by passing over the bodies of those nearer the inlets; but it is more than likely that the bulk of air passing through the room will travel from the inlets to the outlets without changing the air in the central portion. Every variation in temperature or in the force of wind outside will alter the conditions within, and during summer weather the temperature may be considerably higher outside than in; every factor is then reversed. Some improvement may be effected in cold weather by giving the incoming air an upward tendency and providing up-cast flues as outlets with well-distributed openings near the floor level. The incoming air will then fill the upper portion of the room, gradually descend, change the atmosphere throughout, and pass away up the flues; but this arrangement of flues is not altogether satisfactory in summer weather, and even under such conditions change of air will fluctuate with every variation in the force of the wind outside. Consequently, with the best possible arrangements, so long as natural means alone are relied on, there must be constant, intelligent, and personal attention if comfortable

ventilation is to be secured; nevertheless I am bound to confess that with care in the design and arrangement of suitable inlets and outlets, with adequate heating power, and with proper means for regulation, it is quite possible with personal attention to secure reasonable ventilation by natural means in buildings only occasionally occupied. None but very sensitive people are quickly affected by breathing a partially vitiated atmosphere, and few remain for long at a time in crowded places, so that when rooms are unoccupied windows and doors should be freely opened, and ample change of air secured. If this were regularly done, and thorough cleanliness were observed in and about buildings, there would be less cause for complaint of defective ventilation.

Every individual by respiration and exhalation throws off moisture and animal matter, and when a number of people congregate within an apartment the defilement of the atmosphere is considerable. Rapid change of air will carry much away, but with defective ventilation much is deposited upon exposed surfaces in the building in consequence of variation of temperature, and only prolonged and greater change of air than would be tolerated while a room is occupied will dissipate the contamination.

In the hope of disposing of the charge which has been made against me, that I am a prejudiced advocate of "plenum" ventilation, I now state most distinctly that unless it is continuously applied it is questionable whether it can be permanently successful, and I am not inclined to advocate its employment *unless* its advantages are considered worth the cost of continuous working. I cannot think it is sufficient to ventilate a building simply for the periods during which it is occupied and then to stop the mechanism and bottle up the air until the next period of occupation.

Let me illustrate this by directing your attention to a railway carriage. Standing still how stuffy it often is, particularly in hot weather; but when rapidly moving along it is freshened up. Yet, on again standing still, it loses its freshness. That is an example of ventilation produced by mechanical means intermittently employed.

Now I wish to explode another fallacy.

Downward ventilation has been termed "down draught," apparently in the hope of condemning it by giving it a bad name. Advocates of the open fire have stated that to propel air into the upper portion of a room and let it go out from the lower portion is unnatural. Fortunately this can be easily disproved. Take an ordinary room with an ordinary open fire and smoke flue. Test it as you will, and, apart from occasional strong winds setting up adverse currents, resulting at times in what are termed "smoky chimneys," it will be found that the only detectable outgoing of air takes place by the open fireplace flue, the lower opening of which is

about 2 ft. 6 in. above the floor level. Many people open the upper portion of a window when the temperature of a room, heated by an open fire, is excessive, holding the idea that they are letting out the hot air; but with rare exceptions the temperature of the room is then lowered by letting in a larger volume of colder air, which compels a more rapid outgoing of heated air up the flue.

It is true that in most cases no special inlet for air is provided, and that in consequence air enters by any casual, and probably dirt-concealing holes, cracks, and crevices—mostly around the lower portion of the room—whence it makes its way in narrow streams, moving with considerable velocity towards the fireplace, causing unpleasant draughts, while little change of air takes place in the upper portion of the room. Yet, if the same room were provided with a suitable inlet at a foot or two below the ceiling, on the same side as the fireplace and as central thereto as may be, the incoming air would become tempered by contact with the ceiling, walls, furniture, &c.—previously warmed by radiant heat from the fire—it would, by its inflow, force the atmosphere of the room downwards towards the fireplace opening and up the flue to the open, without causing discomfort to occupants.* Under these conditions air is propelled into the room from a reasonable elevation, where it is generally fresher than near the ground-level and more free from chance contamination. Force of wind outside, varying as it does in intensity, will materially affect velocity of change within. I have therefore devised a simple automatic regulating inlet, consisting of a curved enclosure to a noiseless flap hung eccentrically so that the area of the inlet opening is diminished proportionately to the force of wind playing against it; but satisfactory results can be obtained even without this refinement if the inlet be provided with louvres for distributing the air at low velocity. I am perfectly aware it is not the method usually adopted, nor is it the one recommended in most works on ventilation. Do not, however, condemn it without proper trial; think it out, and you will, I believe, come to the conclusion, as by practical experience I have, that it is most effective in securing the efficient ventilation of an apartment; and if so, then the relative positions advocated for inlets and outlets with the "plenum" system are correct.

Complaints being so frequent of defective ventilation—even in buildings where outlay has been incurred in the expectation of securing, let us say, comfortable ventilation by natural means—is it surprising, when we consider the marvellous results of mechanical power, now used for the benefit of mankind in almost numberless ways,

that attempts should be made to employ it for improving the ventilation of buildings?

Mining operations and many occupations have for years been carried on which would have been impossible without the assistance of ventilation brought about by mechanical means. Thousands of power-driven rotary fans and air-propellers are in daily use, proving the possibility of changing the air of enclosed spaces. Centuries ago the necessity for securing greater change of air within buildings than could at all times be naturally procured was recognised, and a few advanced minds suggested the employment of bellows and other primitive appliances worked by hand or water-power. I have seen quaintly illustrated treatises on the subject; and although failure doubtless resulted from inadequate knowledge and appliances, there is no reason why, with air-propellers and power appliances brought to the high state of perfection they are to-day, we should not take advantage of them for securing ventilation within buildings.

It is no argument to say, "I don't like plenum ventilation," or even to point to failures which have occurred; nor is it sufficient to bring forward some fanciful idea that in an undefined manner air moved by mechanical power is deprived of an unknown vital essence. It has been suggested that by warming air otherwise than by the sun's rays this intangible essence is destroyed, and that is given as a reason why some people condemn plenum ventilation; but it is altogether begging the question, because in summer time, when "plenum" ventilation is so effective in maintaining a cooler atmosphere within doors than in the open, no heating is employed. Will it then be contended that, by lowering the temperature, such will-o'-the-wisp essence again disappears? Unfortunately my scientific knowledge is not sufficiently profound to enable me to determine if there is even an element of truth in these imaginings; but even if there be, which I strongly doubt, it is easy to demonstrate that with a carefully devised installation of ventilation on the plenum system, the necessary warming and cooling of air are effected with less chance of deterioration than by any other method. In addition to which the air is drawn from sources known to be at a distance from contamination; it can be cleansed from suspended impurities, brought to suitable hygrometric condition, and passed on to apartments without contact with impurity.

I am, perhaps, as painfully conscious as anyone that there have been many failures with "plenum," and so there have been with every other method employed for securing ventilation; but my experience convinces me that failure is not the fault of the system, but that it results either from want of knowledge and experience on the part of those who installed it, or from neglect. It is only by careful comparison of results and a

* See article on Ventilation in *Modern House Construction*, vol. v. (Blackie and Son, Ltd. 1899.)

minute examination of the means and methods employed that a true estimate of its value can be ascertained. Personally I have not the faintest doubt that by the "plenum" system the efficient ventilation of a building can be effected. The principle is perfectly sound; yet I realise there are two sets of objections to be met: the first I class as purely fanciful, most of which I have already dealt with; the second are more tangible, and relate to the means and appliances which should be employed and the cost. To review all the means and appliances at disposal is quite out of the question on the present occasion, but they have a very decided influence, not only as regards partial or complete success, but also a direct bearing on the question of first cost and maintenance.

Much as I dislike making comparison between the work of others and that with which I have been connected, this discussion has been forced on, and we are to meet in the hope of gaining instruction which may be placed at the service of the public. Consequently I shall briefly compare, principally as regards costs of power employed, a few installations of plenum ventilation, and as I shall make use of information derived from printed particulars given by the engineers themselves, we shall at least have fairly reliable data.

Messrs. Carroll & Batchelor, of Dublin, neither of whom is personally known to me. It runs thus:—

"I had been greatly interested in the accounts I read from time to time of the progress of the Royal Victoria Hospital, Belfast, and more particularly in the arrangements for heating and ventilating it. I have had some experience of the plenum system, and have never been much in love with it. I looked therefore rather with distrust on a building which had been so designed as to make such a system obligatory. Mr. Henman is to be complimented and congratulated on his courage in designing such a hospital, and I am free to confess that the result, so far as I was able to judge during my short visit, affords him ample justification for his inversion of many of the accepted canons in hospital design. I was particularly struck by the wonderful uniformity of the temperature maintained in the hospital throughout the twenty-four hours—such as could not, I believe, be obtained by natural means. The freshness of the air in the wards was remarkable, and there was a complete absence of that peculiar odour which is familiar to everyone having to do with hospitals. These results are obtained, I was glad to see, without draught, nor was there any

Building.	Cubic feet of air per hour.	Change of air per hour.	Power.	Estimated horse-power.	Annual cost for power.	Annual cost per million cubic feet.
Glasgow, Art Galleries	9,050,000	Not stated, probably 3 times.	Electricity	66	*£2,695	£298
Manchester, Technical School .	12,000,000	3½ "	"	80	£3,224	£269
" Midland Hotel	6,000,000	3 "	"	40	£1,612	£269
Birmingham, General Hospital.	13,000,000	7 "	"	19	£766	£59
Belfast, Royal Victoria Hospital	5,000,000	7 "	Steam	5½	£100	£20

Consider the importance of such a comparison as regards the number of changes of air effected per hour. May not success in great part depend upon giving an adequate change of air? And surely the question of cost would be a determining factor in many cases.

Reference to the Paper by Mr. Henry Lea given in the Institute JOURNAL for 10th December 1903 will show how this economy in cost of power is effected. In the discussion which followed, Sir John C. Holder personally testified to the success of plenum ventilation in the General Hospital, Birmingham, which he has systematically visited, one may say almost daily, during and since its erection. I could produce a large number of letters addressed to me containing congratulations on the satisfactory ventilation of that and the Royal Victoria Hospital, Belfast; but I prefer to place before you one because it was not written to me, and because it is from an architect experienced in hospital design, viz. Mr. Batchelor, of

perceptible movement of air in the wards. Everywhere I went through the hospital I saw evidence of great forethought and skill in design, particularly in those small details which count for so much in the economical administration of the institution. The building is a credit to the architects and also to the contractors, who have put such honest and—if I may use the expression—sympathetic work into it. Everything appears to have been done as well as it was possible to do it."

It has been well said that the only way to arrive at a right judgment as to the practical utility of plenum ventilation is to carefully examine it in a building in which it has been applied with knowledge and experience. All I ask, in conclusion, is that the subject may be approached without prejudice or regard to merely personal interests and fanciful misgivings, for a right understanding by the architectural profession on the subject of ventilation must have a vital influence on the health and well-being of the people.

* The costs of running are worked out proportionately to the amount of power, presuming it is employed continuously.

DISCUSSION ON THE PLENUM SYSTEM OF VENTILATION*

At the General Meeting of the Royal Institute of British Architects, Monday, 6th June 1904.

The President, Mr. ASTON WEBB, R.A., F.S.A., in the Chair.

MR. S. PERKINS PICK [F.] read the following remarks:—Before offering any criticisms upon this very interesting hospital at Belfast, I think that every credit should be given to Messrs. Henman & Cooper for the courage—one may almost say the audacity—with which they have formulated and carried out in all its details a hospital building in a manner so utterly at variance with nearly all preconceived notions of buildings of this class. It must be a source of great gratification to them that the institution after eight months' occupation should prove so absolutely satisfactory to those who have the working and management of it. I have had the pleasure of making a careful inspection of this hospital under the guidance of the superintendent, and am bound to confess that in hardly any other instance have I ever received such a laudatory description from the authoritative head of such an institution; indeed, this enthusiasm was not confined to the superintendent alone, but the sisters, the nurses, the engineer, and even the patients themselves, appeared to be equally pleased with the general arrangements provided, and with the heating and ventilation system installed.

Now, after stating this it may appear to be blowing hot and cold when I add that, in spite of all the satisfaction expressed, in my judgment the "Plenum" system of heating and ventilating for a hospital is not essential; nor do I think that the advantages of administration gained by having the wards all on one floor are commensurate with the risks incurred, and the loss involved, by the omission of those side windows for prospect and ventilation which most of us so dearly love and appreciate.

In hospitals the superficial area and cubic space required to attend properly to each patient are necessarily very large, and therefore the requisite changes of air are less difficult to obtain than in such buildings as assembly halls, workshops, schools, out-patients' departments, and similar places where a large number of people are closely packed together. For these latter buildings I am firmly convinced that, up to the present time, no system gives such satisfactory results as a properly designed "Plenum" system, especially so when

some mechanical means is arranged for creating a positive extraction of the vitiated air.

In my opinion a hospital planned in separate pavilion blocks, arranged with windows on either side of the wards, with a bed between each pair, an easily cleaned ventilating heating coil between each pair of beds, and with central open fires, is preferable.

To me it appears that this well-recognised style of building is more pleasant for the patients, and adapts itself so readily to effectual ventilation by opening the windows that the complications of a "Plenum" system of heating and ventilation are unnecessary. Moreover, the fact should not be overlooked that in hospitals the majority of patients are in bed, and thus are able to protect themselves from any direct cold draughts which may occur. I know it may be said that the ordinary atmosphere of some of our large towns is so laden with blacks and impurities that it is desirable to wash and filter the air before allowing it to enter a hospital, and in some densely populated districts where hospitals are on restricted areas this contention may be used as an argument in favour of the "Plenum"; but at Belfast the new hospital is erected on an open site of six acres, with the prospect in the near future of this area being doubled, so that the contention does not, I think, hold good in this case.

For operating theatres and out-patients' departments I am of opinion that the "Plenum" system is not only desirable, but is almost essential: in the former because the heating and ventilation are easily controlled, and in the latter because without some mechanical appliances, of which none are better than the "Plenum," it is almost impossible to properly ventilate a waiting hall crowded with people of the lower classes, and generally entirely surrounded by surgeons', physicians' and other rooms.

The arrangements provided at Belfast for the out-patients' department are, in my judgment, quite excellent, and, although crowded on the occasion of my inspection, the various rooms were entirely fresh and healthy.

I agree with Mr. Henman that great caution is necessary in the application of "Plenum" ventila-

* See Mr. Henman's Notes on the subject, *ante*, pp. 427-29; and the Papers by Messrs. Henman and Lea on

"The Royal Victoria Hospital, Belfast," *JOURNAL R.I.B.A.*, 19th December 1903.

tion, and that full knowledge is required to apply the system successfully; indeed I would go further and say that, in my judgment, the causes of failure with mechanical systems of heating and ventilation generally, and particularly with the "Plenum," more often rest with architects than with heating engineers. I have heard of architects who not only mature their plans, but actually commence building operations before deciding upon the system of heating and ventilation. Can one wonder at the failure of a system, particularly one like the "Plenum," which largely depends for its success upon flues of ample area and good lines, when arranged under such adverse conditions?

Another cause of failure in the "Plenum" is that of defective drainage, especially when a building is upon a clay subsoil. This matter is so extremely important that it is difficult to overrate its significance.

In some large institutions I have myself noticed that exposed drains have been arranged to cross ducts in an open pipe connected with an ordinary earthenware drain-pipe just outside the duct walls. Any settlement of the duct walls is sufficient to break the joint between the junction of the iron and earthenware drains. These ducts usually carry steam and other pipes, and consequently the temperature in them varies very considerably, indeed quite sufficiently to cause the same joint to be broken by contraction and expansion of the length of exposed iron pipe. In a clay subsoil it is extremely difficult to ascertain whether the damp in walls is ordinary ground moisture or whether it is a sewage saturation. To pump air along ducts where there is a possibility of this is, I think, the most fatal danger to be guarded against, and wherever the "Plenum" system is adopted I think that all drains should be dropped below the level of the air ducts, and should generally be carried out with strong cast-iron pipes.

Spacious ducts are requisite for carrying steam, hot water, and other pipes to the various blocks of all large institutions, and the same danger which I have indicated exists in all these buildings; but it is largely intensified in the case of "Plenum" ventilated buildings.

Messrs. Henman & Cooper have at Belfast wisely provided a separate duct for the necessary hot-water and other pipes, the main air supply duct being thus kept nearly clear of them. The lines of drains appear to have been so arranged as not to cross the main air supply duct; I was unable to ascertain whether or not they were kept below the level of the main duct, but what did seriously frighten me was the enormous length of drains which must of necessity be below the hospital buildings. There are the drains from the several operating theatres, and from a number of ward kitchens and bath-rooms, with the complications of traps and anti-siphonage pipes thereto belonging, the latter being all properly carried up through

the roof. The whole system is, I was informed, of iron pipes, apparently planned and executed with great care; but the very unpleasant fact remains that there is a length of about 450 feet of straight main drain, not reckoning the very large number of branch drains connecting with it, all below a dark though, it is true, well-ventilated space under the buildings. Mr. Henman will no doubt correct me if I am wrong, but the only traps to any of the fittings I could find were those immediately below the various sinks, &c., and some floor traps. If I am correct, it has not therefore been thought desirable to make use of that ordinary outside trap or gully which usually intercepts sink, bath, and other wastes before drainage finds its way into the foul pipes below the ground. There also appeared to be a lack of those inspection chambers to the drains under the buildings which most of us think are essential in complicated drainage systems for institutions like this. These no doubt are omitted because of the fact that they must, if provided at all, be below the hospital buildings.

I cannot help thinking that this drainage system may prove a source of difficulty in the future.

Among other details I inspected the cast-iron vertical drain-pipes connecting the fittings to the drains, and, in the case of those which apparently received the wastes from baths and slop hoppers, the calked lead joints already begin to show unmistakable signs of drawing. This contraction and expansion caused by hot water running down the pipes is very difficult to obviate safely in a system like that adopted at Belfast. In ordinary cases, where the pipes are all outside a building, the use of an expansion joint is an efficient method, because if the joint slightly opens, the pipe discharging into an outside gully obviates any serious objection; but in the case of this hospital it may be the joints immediately below the fittings, thus opening the drainage system to the hospital, or it may be the joints of the pipes below the building that will draw. From what I saw it does not appear likely that the drains can remain bottle-tight for any lengthened period.

Possibly it may be argued that, supposing there were a few leaky joints in the drainage system, what does it matter, when there is a constant sufficient pressure of air from within the building to prevent any sewer gas finding its way inside? But most of us will, I think, agree that it is better to keep dangers of this kind at arm's length, by putting all drains outside the buildings where they are open to the atmosphere; and I think this one objection to the arrangement of a hospital on one floor, extending over such a large area as that we are discussing, and thus necessitating all these internal drains, would wisely prevent most architects from adopting the plan of a "Plenum" ventilated one-story hospital.

Another detail of the sanitary system to which I think exception may be taken is the low termina-

tion of the ventilation pipes to the w.c.'s at the end of the wards: these are carried only just through the roof at the balcony ends, and when the atmosphere is still it appears to me that there is some chance of a down draught from them being objectionable to any patients who happened to be on the balconies.

The arrangement of the nurses' slop-room and the w.c. for patients I do not like. I am quite well aware that the objection I am about to make is found in many other hospitals, but that does not, in my opinion, lessen the fault of it, which is that the patients' w.c. is approached through the nurses' work-room, where they must spend a good deal of time washing utensils, mackintoshes, &c. Nurses, I know, become case-hardened, and do not seem to have, or at any rate are not allowed to show that they have, that delicacy about such an arrangement which most of us have; but is it not a little too bad to arrange a w.c. in a manner like this at Belfast and elsewhere, where the division between that and the nurses' work-room is merely a wood partition, which for good reasons is kept well off the floor, and finishes well short of the ceiling level, with the result that it must at times be very difficult for any, even a case-hardened nurse, to face it out? I certainly think that the patients' w.c. ought to be better separated from the nurses' slop-room than is the case here, where the main point has appeared to be so to plan the sanitary annexe as to facilitate the one outlet in the w.c. for the "Plenum" system of ventilation, which, I am pleased to add, acts in a remarkably efficient manner in ventilating the annexe.

A somewhat similar arrangement is provided for the ophthalmic wards, where the patients' w.c. is placed in a corner of the bath-room; this, surely, is not so good a plan as providing a w.c. separately approached from the ward.

The non-provision of any larders to the ward-kitchens is, I presume, explained by the proximity of all the wards to the main kitchen. But sufficient milk has to be kept there for the day and night supply, and this in a temperature of 60° cannot be an improvement upon the ordinary method of providing a small larder, well ventilated from the outside, for this purpose.

I notice that Mr. Henman states that open windows with "Plenum" ventilation are objectionable, and that by making all the windows of the sanitary annexes fixed he is able to delete the intercepting lobbies, which may possibly be justified in this case; but, speaking generally, I am strongly of opinion that it is a great mistake to construct fixed windows. There are many days in the summer time when it is difficult by the "Plenum" ventilation to obtain that freshness in a building which is so desirable; in such cases why should the windows not be opened? What does it matter in such a case, if the flues are well arranged from sources of contamination, whether they universally act the

right way or not? And, besides, in many classes of buildings are there not times when by opening the windows a good air flushing can be given to them without incurring the expense of running the fans at all?

The engineering work of this hospital has undoubtedly been designed and carried out in a most careful and able manner. There are, however, some points about this portion of the work which might possibly have been improved. I consider that the bottom of the main air inlets should have been at least 8 feet above the ground level instead of about 3½ feet, as they are. The boiler-house should have doors or shutters to prevent cold air getting to the boilers, and good top ventilation provided in lieu of the openings. The feed-water to the boilers was on the day of my inspection nearly cold: this is a serious mistake, as it not only increases fuel consumption, but is detrimental to the boilers themselves. The hot well which receives the condensed water is not a good plan; better arrangements can now be had by dealing with the various condense and waste mains leading from the several receptacles which contain steam by an arrangement of heater-condensers. The exhaust steam from engines, &c., after performing various functions in heating hot water, is allowed to go to waste; this is not the most economical arrangement. There are a good many steam traps in the buildings which might have been left out had the system of piping been laid out on more modern lines.

The engines and fans for the "Plenum" arrangements are excellent in design and finish, but whilst I say this I cannot but feel that it would have been better for the engineering scheme had it been laid down more comprehensively, and made to embrace the general lighting of the institution by electricity, using the exhaust steam from the generating engines for supplying the whole of the hot water required, and the remainder used in the general heating system. Had this been done, the "Plenum" fans and laundry machinery could have been driven by electric motors, and a considerable annual saving to the institution effected.

Speaking generally of the "Plenum" system of heating and ventilation I feel, in concluding, that it is only just and due to the architects and engineer to state that, in spite of any criticisms which I have offered in these remarks, the scheme as carried out in the Belfast Hospital is, in my judgment, one of the very best that have up to the present time been executed, and, whether other architects follow the daring lead of Messrs. Henman & Cooper or not, the enormous educational advantage that they have given us in having the boldness to carry out their convictions is, I feel sure, properly appreciated by every member of the Institute.

MR. A. SAXON SNELL [F.] said that the original discussion was on Mr. Henman's Belfast

Hospital, which, if he might so put it, was the very incarnation of plenum ventilation; it was built absolutely for that system of ventilation, and its merits and defects would stand or fall by that system. He thought they had not had an opportunity of discussing the hospital and doing justice to the very careful way in which that building had been designed. Many people imagined that the building of a hospital was little more than an arrangement of wards upon certain well-defined lines and the rounding of all the corners; but, as Mr. Henman had showed, it was very much more than that. An enormous amount of consideration had to be given to every detail, and he was much struck with the care, he might say the enthusiastic care, which Mr. Henman had given to the building. It was a curious thing that Mr. Henman had reverted there to a type of building which was erected by his (the speaker's) father no less than forty years ago—a building which was standing now as wards for aged paupers in the Marylebone Workhouse. The wards were very much the same, but rather worse than Mr. Henman's, because they had no top light. They accommodated some 600 or 700 people, who, he was assured, lived to quite a phenomenal age. Nevertheless, he would not recommend that form of ward for hospitals. Turning to the main subject, it was a somewhat unfortunate thing that the question of plenum ventilation had been canvassed so much in the Press by one or two firms commercially interested in the matter. No doubt others, like himself, had been confronted by their clients with a little Blue Book purporting to be a report on the House of Commons ventilation. A little reading of that book would show that it was nothing more than a string of quotations put together, including some remarks of his own, to show that plenum ventilation was a mistake. There was really no need to study such a book, because so many excellent papers had been read upon the subject during the last few years—notably, at the Sanitary Institute and the Institute of Civil Engineers and others. He should like to say that he had no bigoted objection to plenum ventilation. He had tried lately, and he was sorry to say unsuccessfully, to induce a hospital board to allow him to install it for the warming and ventilation of two operating theatres. He should very much like to have done it, because he believed that it was the only method by which those rooms could be properly ventilated and warmed. But they were exceptional buildings, and his whole point was that for exceptional buildings, designed to do exceptional work and built under exceptional circumstances, an exceptional system of ventilation was required, and he knew of no better system than the plenum ventilation for them. But as regarded the class of buildings into which it was desirable to put plenum ventilation, Mr. Henman had somewhat hedged in the paper which had been distri-

buted to them. He told them that he thought it was good for hospitals; but on other occasions he had shown that it was only a question of expense which prevented him advocating it for ordinary houses. He (Mr. Snell) thought that hospitals and houses might be classed together as living places, and those were the places in which he objected to it. Mr. Henman asked—and very rightly—that they should treat the subject scientifically. That was a good point; but they should be consistent, and go deep enough into it. Mr. Henman began by defining the object of ventilation. That was a dangerous thing to do. As Mr. H. G. Wells pointed out at the Royal Institution the other night, definitions were often very misleading, and he (Mr. Snell) thought Mr. Henman's definition of ventilation was also misleading—he would not pause to say why. He (Mr. Snell) had only three points to make, and they had been made over and over again only to be ignored by the advocates of plenum ventilation as fanciful or indefinite. In the first place he submitted that downward ventilation was scientifically or mechanically wrong. If they wanted to move an object it was obvious that the best direction was the line of least resistance, and if they wanted to move it along that line with as little mechanical power as possible, they should take advantage of whatever other forces were going in the same direction; and that was what happened in the ordinary or natural method of ventilation. The principal contamination of air was from their own bodies; but that very air, contaminated as it was, was under a condition which created the very means by which the contamination was taken away from their bodies; because such air was hot, or warm at any rate, and, being warm, it was lighter than the colder air that surrounded it; and that colder air, as Mr. Henman had rightly pointed out, propelled it upwards. Therefore, when, as in plenum ventilation, they had to ventilate downwards, it stood to reason, no matter how economically it was done, that an upward force had to be overcome before they could begin to move in the downward direction. Therefore it was scientifically wrong. His second point was that hot air was absolutely unhealthy. It was pointed out forty or fifty years ago that hot air was bad air to breathe, and the reason was perfectly obvious—because for the same volume warm air contained less oxygen than air at a normal temperature. They could easily calculate how much less oxygen (the very vital element of air requisite to life) was breathed during any given time. That needed no further argument. Thirdly, they were asked to admire the extraordinary evenness of temperature which could be maintained by the plenum system. Monotony was held up to them as a virtue! He confessed that astonished him very much, because they all knew how bad monotony was for them. Everyone who had ever driven or cycled knew how

tiring it was to ride along an ordinary flat road for many miles at a stretch. It was the same with breathing. If warm air was breathed continually, of the same temperature, it became monotonous, and one got tired very soon. It was a curious thing, but the very variations and apparent defects of nature were safeguards. He had not time to refer to those long, unlighted passages for delivering the warm air into the various parts of the building beyond saying that he knew some engineers had recognised the evils of the system, inasmuch as they had suggested the introduction of violet globe electric lights with a view of getting the beneficial effect of sunlight into that enclosed area. He should like to say that he thought Mr. Henman had shown a great improvement, at any rate, in having all his ducts above ground. He remembered many years ago the late Mr. Gordon Smith telling them of a journey on the Continent he had taken with his (Mr. Snell's) father and Dr. Mouatt to see a number of these hospitals. In most cases the machinery was out of order, and they could not see it working; but at one hospital in Berlin it was working, and the superintendent there showed them the system with enthusiasm, pointing out among other matters the ducts where the warm air came in. In one ward it was coming in just immediately under the door. Mr. Gordon Smith observed that dust might be swept into those openings, and he asked that the grating might be taken off. This was done, and Mr. Gordon Smith put his hand to feel where the bottom was, and drew it up two inches thick in mud! So that at any rate with his channels above ground Mr. Henman had improved upon that. But not very much though, because the air still had to be carried along these dark passages, and they knew that air which was not freshened by the sun became foul, even if only in a slight and indefinite manner; and it deposited bacteria on the sides of the channels. Like everything else that was harmful in this life, the pernicious germs always increased and multiplied in the dark; and directly they were subjected to sunlight they became harmless. Finally, there was the moral aspect of the subject. The world was simply full of inventors devising ways of improving on the work of the Creator, and many of those inventions were of enormous benefit to mankind. But there were others which were promoted simply for the purpose of getting round nature and over the effects of its abuse. No greater progress had been made in any science than there had been in medicine during the last century. Yet the great medical men were unanimous in telling their patients that they could only mend them by medicines, and in advising them to go back to nature, to get into the fresh air, and live purely and properly. Drugs and the patent medicines were often excellent in their way for getting over difficulties, and one was liable to

fly to them. But they knew that the effect of taking drugs too often was bad in the end, and it was much better to trust to the machinery of nature itself without external aid. Architects in the same way had a great moral responsibility—to advise their clients to keep to natural methods rather than artificial. Unfortunately at most times architects had to do what they were told, and make the best of bad circumstances; but there were many occasions when their advice was sought; he thought they should be at one with the physician in trying to persuade their clients to have their houses built in such a way that they could live healthily, instead of merely comfortably. No doubt it was a great thing to be able to legislate for people and to do everything for them: to feed them, and clothe them, and keep them from the ills of this world; in short, to be an autocrat ruling and controlling the multitude. But there was one thing much better than that, viz. to teach their fellow men to rule and control themselves.

Dr. RIDEAL said that the analogies brought forward by the last speaker were interesting, but he could scarcely be said to have dealt with the subject from a scientific point of view. His premises might be perfectly true, that if fresh air could be introduced into a hospital, or into a house, a reversion to nature was the best thing; but, unfortunately, hospitals were generally built in towns, where the problem of admitting fresh air was not by any means so easy as it was in the case of a hospital, like the Belfast Hospital, laid out in an open space of six acres. In dealing with the problem of ventilation of a hospital ward, and of a building in a confined space, they must all admit that the natural method of opening the windows instead of introducing fresh air did exactly the converse, and a soot-laden, sulphurous, germful, and carbonic-acid-charged mixture was frequently obtained instead. They must have artificial methods of ventilation, and if that proposition were admitted, then the forcing in of pure air must be a method which would commend itself more than relying upon the extraction of air by means of a fan. Thus they were confronted with the problem of the economic introduction and forcing in the pure air. Of course an underground duct without any light might allow the organisms to settle down and multiply; but if they settled down and multiplied there, so much the better for the air. If they did not, but went on forward, then it was necessary to insure the air being rendered germ-free before it went into the hospital. It was obvious from the illustration of the Berlin hospital, where the duct contained two inches of mud, that that method was neither scientific nor commendable. It was possible, however, to introduce fresh air without the objections mentioned by Mr. Snell. The germs and the dust could be removed, and they could provide warm air or hot air, properly humidified, which was capable of being breathed without the

disadvantages mentioned. It was perfectly true that a less quantity of oxygen per respiration could be introduced when the air was warm, but, on the other hand, if that air were germ-free and dust-free, if it were humidified to a proper condition and of the most suitable temperature, there were four advantages against the one disadvantage of having to breathe a little extra in order to take in the quantity of oxygen required. It was obvious to physiologists that, if the oxygen supply was to be maintained, the organism must do a little extra work. It was familiar to everyone that if they required a greater amount of oxygen they must breathe a little quicker to make up for the deficiency of the quantity they took in per respiration. The removal of the gaseous products of combustion and human beings—the removal of the *esprit de corps*, as it had been called—was very necessary; yet, on the other hand, it was extraordinary how very little effect was noticeable from the products of combustion of gas in rooms. It had been asserted that the sulphur in coal gas was most deleterious to people living in rooms where it was consumed. He had recently had occasion to go very carefully into that subject. People did not die twice as fast in Manchester as in London, although the gas there contained more than twice as much sulphur. The advantage of gas burning in rooms from the ventilation point of view where there was no plenum ventilation was very great as compared with electric light. At Birmingham Art Gallery, for example, gas was chosen in preference to electric light, simply because it was a considerable aid to the ventilation. The quantity of sulphur produced in the air of towns from the burning of gas in rooms was only one-thousandth part of the quantity of sulphur that was produced by burning coal in grates. The actual quantity of sulphur in the air of a room that was lit with gas was less than the quantity of sulphur in the outside air on a foggy day, and on an ordinary day it was not very much higher. He was speaking of an ordinary room with an ordinary lime-washed ceiling and with plaster walls. But when one came to modern methods of decoration, and took away this basic lining to the room, and covered it up with an oak dado, and above that with a thick varnished Japanese paper, and put this Japanese paper on the ceiling or painted the ceiling, and removed all the carbonate of lime which absorbed the sulphuric acid produced as soon as it was formed, they had a very different state of affairs. All these modern methods of decoration caused the sulphur contained in such rooms to increase, and that involved seriously the question of ventilation. He was therefore certain that in an ordinary room, the ventilation through the walls, and through the basic lining, rendered the effect of the coal gas combustion not very serious from a ventilation point of view. With regard to hospitals, the passage of germs from individuals was a

serious matter in certain diseases only. In the case of the influenza and phthisical patients, the spread of germs by coughing, sneezing, and so on, was a serious matter, and made the removal of this germ-contaminated air by fresh air one of paramount importance. They should be kept damp, and that involved the importance of having humid air introduced into such rooms. Hot air, which was dried and not damp, would desiccate these dangerous germs, and they would fall very rapidly; and that point had to be attended to in such methods of ventilation. There was an instrument which he had used occasionally, and had found of very great value in these ventilation problems, which might not be familiar to some members present—viz, Dr. Aitken's Koniscope, which determined the number of dust particles in the air of a room. It was devised some years ago by Dr. Aitken and based upon the fact that air saturated with moisture, on cooling or compression, allowed the dust particles to form nuclei for the water; when the wet air condensed, there fell upon a glass plate a number of dew-drops corresponding to the number of dust particles in the air. By means of that instrument—a very easily carried pocket instrument—they could determine the number of dust particles in the different parts of the room, and could easily trace the ventilation, and get much better results than they could by means of the anemometer, and with far greater ease than counting the number of organisms or by doing carbonic-acid tests.

THE REV. J. B. LOCK, M.A. (Caius College, Cambridge), said he came to the meeting hoping to learn the comparative merits of the plenum and other systems of ventilation. From what they had heard of the advantages of the plenum system as applied to this hospital, and certain criticisms of the system as applied generally, there seemed to be no doubt of its great value. It appeared to him that they were, and had been for many years, accustomed to mechanical ventilation. Some people spoke as if they were living at a time when mechanical ventilation was new; but surely a fire was a mechanical system of ventilation—it was a vacuum system. They had always been accustomed to keep their rooms warm and sweet by the ordinary fire, which drew the air from the ground level and carried it up the chimney, a supply of fresh air coming in when it could. And there were advantages in this system which occurred to him in listening to the first two speakers. The advantage of a fire ventilation was that the fire did not warm the air which they breathed; it warmed the furniture and the bodies of people in the room by radiation; but the air they breathed was to a great extent of the ordinary temperature of the outside air. They were, he supposed, all familiar with the fact that one could tell, on going into a room where there were a great many people, whether there was a fire burning in it or not simply

by the sense of freshness or stuffiness which one found there. The mechanical system of ventilation by the ordinary open fire seemed to him to be as good a one as could be devised without having recourse to a fan. In regard to the two systems of ventilation, plenum and vacuum, he had had to take the responsibility of helping to decide on systems of ventilation at Cambridge: in one building they decided to have the vacuum system, and in another to have the plenum system. The plenum system was put into the Medical School because in that building certainty as to the amount of ventilation was desirable; that is to say, it appeared to them that the plenum system provided a means of securing a certain quantity of fresh air in a certain time, and at the same time giving warmth. The vacuum system was a mere rule of thumb, so far as it seemed to have been worked out at present; but by the plenum system they had the advantage of forcing in air into rooms through a carefully arranged system of air passages, and by means of valves they could decide how much fresh air they would admit into each room. In a place like a medical school, where in some rooms they wanted a greater quantity of fresh air and in others less, the advantage was overwhelmingly in favour of the plenum system rather than any other system at present before them. With regard to the vacuum system, the arrangement they usually found was that the great chimney of the building was used as an extract shaft into which openings were made from such rooms as were within easy reach of it, somewhat in a casual way. There were probably cases in which the system had been worked out scientifically, but he had not found any specimen of it. It was a good system of its kind—very much like the open fire system—the air in the room was warmed by hot pipes, and the air extracted by this shaft. To illustrate, however, one difficulty of that system, he might mention a certain medical school in the Midlands which he went over while they were discussing these matters. They found there that the central shaft had in it a central iron pipe which was to carry the products of combustion up the chimney, and warmth necessary to convert the shaft into an extracting machine was to be derived from that iron pipe; so that they had, say, a chimney six feet square and a pipe in it of eighteen inches to carry the products of combustion. On some days the extracts worked very well, but on others the heat in the shaft was not sufficient to work the extracts from the top rooms; with the result that the air drawn from the lower rooms passed through the "extract" shafts into the others, carrying the smell of the dissecting room through the whole building. Of course that was not a necessary defect of the extract system; it was only a result of not having sufficient mechanical power to work the extract; but it seemed to point to the necessity, whatever system was employed, of having sufficient mecha-

nical force to control the air currents in the flues. It seemed to him that the plenum system was one which, in certain cases, they could not do without. Take, for instance, Pitman's School of Shorthand, in Southampton Row. In that building, which was a comparatively small one, there were a thousand young men and women at work during the whole day—not the same thousand, but different relays—and they were supplied with fresh air in each room by a fan working in the basement. It seemed impossible to imagine any other system of ventilation by which that building could have been made usable with health and comfort by this large number of people except the plenum system; and while one hoped that architects would evolve methods of applying these various systems in various ways, he, as an outsider, but as one who had had to consider the question, should be inclined to suggest that no one system was suitable in every conceivable case; they must consider what were the requirements of each particular case, and apply the system which suited them. He should like to say a word about what was called the natural system. He perhaps must not speak exactly as he should like to speak, because he held rather a strong opinion on the subject. The "natural system," he understood, was one which was supposed to provide ventilation for buildings without using heated flues or fans or other mechanical means. That the air in a building could be frequently changed effectually without the expenditure of considerable energy was impossible. If we could depend upon the wind blowing steadily with considerable velocity throughout the year, the energy could be obtained from it in various ways, as, for example, by means of large open funnels, as was done on board ship. But to suppose that the heat generated by the bodies and breath of people in a crowded room would supply energy enough for its ventilation was absurd: this, he understood, was what was expected to happen on a calm day by the advocates of the so-called "natural system."

MR. KAYE PARRY, M.A., B.E., M.Inst.C.E. [F.] (of Dublin), said there was one point he thought it important to bear in mind in connection with ventilation, viz., the very great weight of the air which had to be moved. Probably few architects realised that point. Although he had had some experience, he had not realised it himself until it was pointed out to him by the Registrar of the Royal Dublin Hospital, that in the lecture theatre of that hospital, where the plenum system was installed, the weight of air moved in that room in one hour was 20 tons. It was rather remarkable that it should be so, and when they came to look at it from that point of view it would be seen that it would be impossible, without resorting to mechanical means, to move anything like such a weight of air in that time; in fact, as the Registrar had pointed out to some people who were objecting

to the plenum system, if they tried to deliver it as they did coals in a cart, they could not get it in quickly enough. Another point he should like to mention, though he was not there to advocate the plenum system, being a man with an open mind on the subject, but very much interested in the question of ventilation. The point was brought under his notice lately, and showed, he thought, that the plenum system offered great advantages. If, instead of having the plenum system, if they could not have open fires, they adopted radiators, and brought their air inlets under the radiators, they had an enormous difficulty in keeping those radiators clean. Whatever might be said about the difficulty of keeping the air-passages clean with the plenum system, the difficulty was ten-fold greater when the dirt became collected in the folds of the radiator. What happened in one institution, a lunatic asylum, that he was concerned with lately—he had not been concerned with the heating of it, but he examined it lately, and was now concerned with it—was this: The patients selected these radiators as their spittoons, and expectorated into them. The sputum of course dried in the radiators, and there was a very serious aspect to it. The sputum was dried in the radiators, the fresh air was introduced through the tubes of the radiators, and the air came into the building laden with these germs, which were first dried and then carefully distributed into the building for the benefit of the inmates. Now, so far as the plenum system was concerned, they did away with the necessity for any of those coils in the room itself; they could have them down in connection with a subway in places where they could be hosed and cleaned and kept clean; and if that could be done, when the air came into the room under the plenum system there was no opportunity for the patients to foul the air as they could do if radiators were used.

Mr. HAROLD GRIFFITHS [A.] said he had been somewhat surprised and greatly amused at some remarks which had fallen from Mr. Snell. He said that the air in a building ventilated by the plenum system was so regular as not to be conducive to good health—that is to say, that more variation was necessary. But Mr. Snell omitted to state that with the plenum system, in winter time, they could raise their temperature to almost any degree they liked; it is only a question of heating the batteries; and in the summer time the temperature of the air could be at least fifteen degrees lower inside the building than outside. Surely that was sufficient variation. With regard to the plenum installation, if anyone would visit buildings such as workshops, or schools, or any building in constant occupation, especially those occupied by the alien population in the East End of London, if they would go there on a wet day and inspect a building ventilated on the plenum system, and then go to similar class of building with open

fires, there would be no doubt in the mind of anybody, whether he was prejudiced against plenum ventilation or not, that the plenum system was the right thing where a building was densely occupied for any considerable time. There were four matters to be borne in mind to make a plenum installation a success. The first was with regard to the air-purifiers. He could not compliment Mr. Henman on the class of screen he had adopted at the Belfast Hospital. He was fully aware that it was the general screen, formed of jute or cocoanut fibre; but although this screen as fixed was an improvement upon the usual kind, it could not on any account be called satisfactory. If the air in Belfast was anything like what it was in London or in most of our provincial towns, it would not be many months before that screen would show the result of impurities being drawn through it. Although this screen was arranged so as to take down in sections, after it had been in use a few months, he ventured to say that neither with the hose, nor with the birch-broom, nor any other appliance could one remove altogether the soot and other deposits upon that screen; and if anyone would walk past a screen which had been in use for twelve months, or two years, in any installation in the United Kingdom, he would find a distinct odour emanating from the screen, which could not but pollute the air which had to pass through it. A fixed screen was not a thing for to-day. A much better screen was that adopted by another patentee—viz. a revolving screen—because it was more cleansing; but that also, in his opinion, was not a perfect screen. He had hoped to have read a short paper that evening to the Institute upon the subject, but as time was limited he had had to postpone it; but when he read that paper, either there or at some other institution, he hoped to show a far more hygienic and sanitary method of cleansing the air than the jute or cocoa-nut fibre screen. The second point he had to mention was with regard to the dust, which in almost all the fifty installations he had visited he had found in connection with the heating batteries. The ducts and the vertical flues were all lined, so that they could be well washed with the hose; but he had never yet seen in the heating batteries anything to protect them from the rust and enable the dust to be properly washed off them by the hose. He had recently been called in to report upon the complaints which had been made about a particular installation, and when he visited the building he found that many of the gratings of the inlets had been partly closed up. Asking the reason, the occupants said that the air coming in was bad air, and the less they had of it the better. As that was the complaint of several of the occupants, he went down into the basement and made a careful examination. He found that all the heating batteries were literally covered with rust and dust, and, of course, directly the batteries became heated a very obnoxious—he

might almost say a dangerous—smell and odour was emitted. All batteries should be either galvanised or covered, so that once a week they could be effectually washed with the hose in connection with the ducts and vertical flues. His third point was in connection with the velocity of the air delivered. Some patentees, and, in fact, some architects, agreed in delivering the air at a very low velocity, and others at a considerably higher velocity. If, however, they had a very low velocity, where the propeller was working, as was done in connection with one patentee whose name was mentioned in connection with Mr. Henman's paper, the velocity was so sluggish that there was not what he might term a sufficient "back" to the air to properly circulate it throughout the whole of the room before it found its way into the extract. Then if they went to the other extreme of another patentee, who had done excellent work in the system, he drove his propeller between 500 and 600 revolutions a minute, and then delivered the air in some of his installations at between 6 and 7 feet a second, with the result that there was a considerable and very objectionable draught caused. He did not know that one could lay down precisely the exact velocity at which air should be delivered; but he thought that for a winter day it should never fall below 4 feet or exceed 5 feet per second, and for a summer day it should never fall below 5 feet or exceed 6 feet per second. That would give a change of air seven times per hour in summer and ten times in winter without causing any inconvenience to the occupants of the building. The last point he should like to direct attention to was in regard to the shape and form of the inlets. There was a tendency, so as to avoid cutting the brickwork in some instances perhaps, or to maintain a more architectural effect in others, to form the bends in the inlets in what he might term too much of a quadrant; consequently the air had a tendency to fall in a horizontal direction upon the heads of the people in the room, instead of properly circulating round the room before it reached the occupants. If the shafts were taken up at a more gentle or a more vertical curve, to shoot that air well up to the ceiling, he felt sure it would obviate the necessity of draughts. With regard to the extract, no lines could be laid down. Every case must depend upon its own merits, but he must say that the extracts in most schemes he had inspected had been much too small. With a plenum ventilation, inducements were wanted to tempt the air to reach the extracts, and it would not be reached without some extract power if those extracts were throttled, as had been the case in, he might say, most of the schemes he had visited. If such matters as these were attended to, which he considered were what he might term the major essentials to a successful scheme, for public institutions and for all buildings where there was continuous occupancy or a large crowd of people

assembled, he felt sure there was no better system of ventilation than that known as "plenum."

MR. E. W. HUDSON [A.] said the subject seemed to be one which might be discussed with advantage at some future meetings. He would like to ask whether the advocates of plenum would tell them whether it was an essential feature of the scheme to introduce the pure air at a high level and to extricate the foul air at a low level. If that were the case, it seemed to him that that was scarcely the right thing to do. He remembered many years ago seeing an account by Sir Joshua Jebb of the system he introduced nearly forty years ago at Pentonville Prison. He believed that system had been condemned, and whether it was in use or not at the present moment he could not tell. It seemed to him that the system was an entirely erroneous one; but Sir Joshua's object in introducing it was that the occupant of the cell should not feel the inconvenience of draughts; and his idea seemed to have been taken from the principle of ventilating collieries, which, of course, must be ventilated from above. It seemed to him a wrong system to introduce the pure air at a high level and to extricate the foul air at a low level, and if that was one of the essentials of the plenum system, he should like some explanation of the reason why it was so considered. He should be very happy, if it was the wish of the meeting, to move that the meeting be adjourned. The system, he thought, was of American origin—at all events it had been largely adopted in the United States—and he had endeavoured to obtain some information as to the opinion of American architects with regard to it. This information, however, had not yet come to hand, and should the meeting not be adjourned, if there was anything in it that the editor of the JOURNAL thought would be useful, any information he could get he should be happy to place at his disposal. He understood it had been adopted at the Capitol at Washington, and that it was not a success; and he was desirous of ascertaining, with regard to the large buildings which were contemplated in Boston and New York, whether the architects there contemplated using it. In the City of London were to be seen announcements that such and such a building was to be ventilated on the plenum system, and that showed faith on the part of some of our leading men; and if they could get the opinions of architects of high standing it would be a most desirable thing.—The speaker concluding by asking whether he might move the adjournment of the discussion, the President said he was afraid another meeting could not be arranged for the present session.

MR. R. LANGTON COLE [F.] said they had heard a good deal about the monotony of the air and the possible effect upon the patients, but surely the mechanical system had been in use long enough now for facts to be obtained; and so far as regards its effect upon health, those facts

had not been mentioned to them. Surely it was possible to compare well-designed and large pavilion hospitals on the same scale as the Belfast and Birmingham hospitals, and to know what had actually happened to the patients; what were the percentages of recoveries and the general health of the hospital, as stated by the superintendent in each case. Could not some unprejudiced person tell them what was the actual result? His own opinion and that of many others present was that the mechanical system of ventilation was very useful for special cases, but that for a general hospital it was not necessary.

Mr. ALAN E. MUNBY said he should have been glad to support Mr. Hudson if he had moved the adjournment, because they had had some criticisms and some remarks; but, for the most part, they had not been of a scientific nature, and he thought perhaps that some comments which a mathematical friend of his had been good enough to get together might be of interest. The problem was as to the use of a furnace for ventilation purposes, and he divided the work which was done in the chimney into three headings: first of all, the overcoming of the inertia of the air, which had been already mentioned as a very important factor; secondly, the forcing of the air through the coals of the furnace; and thirdly, the overcoming of the friction of air in the shaft itself. His calculations went to show that as much as 90 or even 95 per cent. of the total work that was done was applied in merely forcing the air through the coals, and therefore, if air was being actually dragged through a furnace which contained a coal fire, that meant a very large proportion of work done as compared with what would be required for a less resistance, say a gas fire. Turning to flues, his friend had worked out the case of a cylindrical flue, and there he divided the total work into (1) that required to overcome the initial inertia of the air, (2) restarting it at the bends, and (3) the friction against the walls. As one of the previous speakers had pointed out, the friction at the bends might be very considerable. If the bend was turned right back upon itself at two right angles, the whole work of restarting the air had to be gone through again; that is to say, the work done at restarting was equal to the whole of the work of moving the air at the beginning; and at a right angle it would be between a quarter and half of that amount. That emphasised the great necessity of rounding off the bends which they all knew to be true, or at any rate placing them in such a direction that the air was stopped as little as possible. He would like to mention one other thing which had always struck him as very much neglected in these cases, and that was the possibility of using the furnace which was to heat the building as a means of ventilation. They had been in the habit of installing furnaces for heating purposes, under whatever system might

be used, so that the air was drawn in through the boiler-house door. There was no reason why those furnaces should not be made to suck air through flues, if they were sufficiently closed, in order to ventilate part of a building. The American "Ideal" boiler was, perhaps, one of the most perfectly closed boilers now existing; and he thought it would be interesting to work out the sucking power of a stove to see how it would compare with its warming capacity. He would not trouble them with the actual figures on which the calculation was based, but the result, although it was disappointing, might be of interest: it was that a furnace for a properly heated building was capable of changing the air in the whole building once in every two hours, so that if the furnace was made to suck in the whole of the air from the inside, it would change the air of the building once in every two hours. That would be useless for the purposes of general ventilation; but might it not be applied with economy, where a large building was being heated, to a part of it, which might be so ventilated without any cost at all, except the initial cost of the ducts?

Mr. MAX CLARKE [F.] said he took it that their object that evening was to decide more or less whether natural or automatic ventilation should be used, as opposed to what was now known as the plenum system. They had had certain remarks as to the moral aspect of the question, and also remarks which applied more or less to natural ventilation; but they had had no information whatever as to what the advocates of natural ventilation did really advocate. Mr. Snell had said more or less about it, and another speaker mentioned that if the wind always blew in the proper direction things would be satisfactory. He came to the meeting with one or two ideas on the subject, and the only practical information he had received was that the plenum system was good in certain cases. But those certain cases he would like to think were all cases where large buildings were concerned—that there was no other method, no automatic method whatever, which would ventilate a large building properly. The object, he took it, was to change the air at a certain specified rate. Whether, as one speaker said, it ought to be 4 feet or 5 feet, or, as another said, 6 feet or 7 feet, he was not concerned with; that was a matter to be regulated by the people who devised the system. Nor was he concerned as to how the air should be cleaned. All those were matters of detail. He was not concerned with whether they used the coir, or whether they used the glass battery tubes covered with glycerine, or any other matter, so long as the air was pure. What he was a little concerned about was, did the mechanical propulsion of that air and the treating of it by washing it and sending it over heating batteries change the air in its essence? That was what he would like some information upon. He had devoted years to

the subject, but this particular point was a purely scientific matter. They knew, or were supposed to know, that four parts in ten thousand of carbonic acid gas was as much as they could do with, and that they should not have more. Supposing they had an automatic plenum system, and into those plenum tubes they discharged a certain amount of oxygen, and reduced the four parts in ten thousand down to two parts, would that air be better than that which was blowing over the ocean; or was there some quality in the air of the ocean which they knew nothing about yet? Was that the thing they wanted? Nobody, he supposed, would for a moment deny that patients would be better always in the sunlight—that, he took it, was granted by everybody—but one could not always have sunlight in Queen Square, where he lived, which was crowded with hospitals; and one could not have sunlight in Liverpool Road, he should think, nor could they always have it at St. Bartholomew's. But given those things, granted that the hospital should be there, was it not better to send in to the patients air as pure as they could make it rather than trust to Providence that they should get it in naturally? That was the question they had to decide. All those little bickerings as to how it should be done, and the bend of the pipes, and the size of them, were absolutely matters of detail which they could not learn all about at first. There was no doubt whatever that any system of mechanical ventilation was capable of improvement; but if nobody began, like Mr. Henman, they should never get to the end. Then there was another point. He thought they, as architects, did not provide a proper system of tubes to carry this air along. In the first place he thought it was the smaller tubes which required very much more attention, and he should like to advocate or suggest that somebody should experiment with cast-iron tubes enamelled in long lengths—not brick tubes, where one had a multiplicity of joints which made the surface very rough indeed, but for all the minor ones cast-iron enamelled ones, and fitted so that they could be opened. He knew it was a problem, but then architecture was a problem from beginning to end, and if a hospital was going to be a place that was properly ventilated, it seemed to him that that was one of the things that required a considerable amount of attention. Mr. Snell said that for exceptional work in exceptional buildings natural ventilation was *not* the thing. But was not every hospital an exceptional building?

THE PRESIDENT said the hour was so late he was afraid they must put an end to this interesting discussion. He felt with Mr. Max Clarke that they had not yet quite got to the bottom of it. At the same time there was no doubt that it was a most interesting and vital question for architects to take up. When they erected buildings they must make up their minds

as to the best way of ventilating them; and the time had gone by when they could ignore it and put up their buildings without it. He thought, therefore, that they had spent the evening well, and that it might be desirable to devote another evening to the subject. Those were the most useful evenings they spent when they met there and discussed in a friendly way the various problems they had to deal with. There was one point he should like to have heard some opinions upon, viz. as to the question of cost—that is, the comparative cost of the plenum heating and ventilation and the comparative cost of the ordinary steam heating and ventilation. He thought the question of cost was rather in favour of the direct heating system by radiators. But, of course, one had to remember that by the plenum system the building was not only being heated, but was also being ventilated; and therefore, in considering the cost of the two systems, it was not fair to take the cost of heating in one case and the cost of heating and ventilation in the other. Personally he agreed with what many of the speakers had said, that for rooms which were largely crowded with people, class-rooms in schools and institutions of that kind, it was essential to change the air very frequently; and, to his mind, the plenum system was the way by which they could secure a continuous change of air. He thought, for instance, when their own meeting room was full, if they had some means of changing the air a little less natural than opening all the windows at the back, it would be a distinct advantage, especially in the winter. In conclusion the President thanked those who had spoken on the subject, and especially Mr. Pick for the paper with which he had opened the discussion.

MR. GEORGE H. BIBBY sends the following communication, dated 6th June:—

During the past month I inspected the Royal Victoria Hospital at Belfast for the purpose of ascertaining the actual results of the very unusual methods of planning adopted and the effects of the plenum system of ventilation there installed.

I found that fifteen wards (of the seventeen main wards, for fourteen patients each), being lighted only from the roof and from windows at the far ends of each ward, were less cheerful and bright in appearance than the end wards, although the latter had windows only on one side, and not on both sides, as in the case of the best modern hospitals; and the end wards, *with* these windows, have a far less "boxed-in" appearance; in effect, the lengthy and unbroken extent of wall surfaces, where there are no windows, gives a monotonous appearance to the wards, which cannot fail to affect the comfort and well-being of the patients.

I observed that in each of these wards there is a great space above the wall inlets and under the roofs quite unprovided with any means of ventila-

tion; the air inlets being near to the top of the walls, the air introduced passes very rapidly downwards to the outlets near to the floor, thus not ventilating the spaces above the inlets.

It at once occurred to me also that the air in the wards *between* each series of inlets was not being removed from the ward so quickly as the air more directly in a straight line between an inlet and an outlet, and that although the temperature of the ward is kept at a fairly even level, yet the quality of the air must vary very much.

That much of the foul air of some of the wards failed to become ejected by way of the outlets near to the floors (although I ascertained that there was a very strong draught *towards* the outlets) was very clearly indicated by the strong odour of chemicals observed in the small passages between the main corridor and the wards; these odours came from the operating rooms, which were in use at the time of my visit, and were detected so far as the entrances to the main wards and to the interiors of those wards near to the doors.

This mischance may have been the result of some error of judgment or neglect on the part of some members of the staff, but a ventilating system which is dependent entirely for its success upon the *constant* attention of officials is obviously at a disadvantage with the competition of natural systems where arranged in a scientific manner.

It should be observed that the mechanical arrangements in this hospital are very complicated, and the temporary failure of one or more of these, or the occasional results of ignorance or neglect, might at once throw the ventilating and heating arrangements into confusion, while the vast extent of more or less inaccessible fresh and foul air-ducts, difficult to examine, and costly to cleanse, are disadvantages likely to become more troublesome as time advances.

That air introduced through such long and dark passages (as are adopted in this hospital) is less desirable than fresh air introduced by natural systems of ventilation should be admitted; but a disadvantage at least as great, in the case of this hospital, is the arrangement by which the foul air is expelled (or partly expelled) from the wards.

I have pointed out that the foul air and odours from the smaller wards are not wholly expelled by means of the exits provided in the lower levels of those apartments, but find their way to the passages and other wards. But even where carried through to the channels and ducts intended for the purpose, the foul and contaminating air and gases must in time greatly pollute the ducts, infecting the materials of which they are constructed. So long as these ducts really act as outlets, the danger is not so considerable, although the formation of insanitary conditions involves some risk in the event of the air-ducts not being actually air-tight.

But in the very possible event of the provision of fresh air failing through a temporary breakdown

of the engines, fans, and other appliances, or of the neglect or ignorance of the officials, the high level inlets might very easily be temporarily converted into outlets, while the "fresh" air would come in (temporarily also) through the openings *intended* to be used as outlets, after passing through the ducts infected by the passage of foul air for considerable periods.

That this reversal of direction is a real danger is certain, as boilers, engines, and machinery, even when in duplicate, as in this hospital, may fail if even for only half an hour; while in the meantime the foul air-ducts, at low levels in all cases (being charged with heated foul air, having no propulsion against which to resist), must return air to the wards by the channels through which it came.

The plenum system, as applied to this hospital, requires that no windows shall be opened, and one of the objections raised by a local authority, who evidently knows the people of the Belfast district, is that the patients will leave the institution with the idea that windows should not be opened where people are sick. This is just the idea most necessary to combat, seeing that many classes of patients recover best when exposed to every wind that blows; and I do not perceive any reason why patients should be compelled to live for weeks and months in an unnatural atmosphere in the wards of this hospital. That it is unnatural is admitted by one of the doctors belonging to the institution, who has said that "it always gave him a headache." I am able to confirm this to the extent that, after being in the wards for some considerable time, I experienced a distinct feeling of relief upon again reaching the outer air.

It has been necessary for me during the past few months to seek for detailed information *re* the ventilation and heating of hospital wards. As I am about to issue a work on the subject, very much evidence has been brought before me showing the costly nature of certain plenum systems which have utterly failed, and nothing has yet been advanced to show that a scientific natural system, properly applied, ever failed to obtain better results than were at any time secured by the most costly and complicated mechanical or artificial methods.

From information derived from a leading authority of this hospital I learn that the coal bill in connection with the old buildings for the same number of patients was for only 500 tons, while the present consumption is no less than 2,000 tons!

I must conclude by expressing the pleasure I derived from the inspection of a very fine institution, and which I have only ventured to criticise as regards its general plan being cramped upon insufficient ground area, and the principles upon which the heating and ventilation have been contrived.

* * Messrs. Henman and Lea's reply to the foregoing discussion will appear in the next issue.



9, CONDUIT STREET, LONDON, W., 11th June 1904.

CHRONICLE.

The Annual Elections.

The following members acted as Scrutineers in connection with the annual elections of the Council and Standing Committees for the ensuing year of office:—*Fellows*: Messrs. Francis W. Bedford, R. F. Chisholm, George F. Collinson, R. Clarke Edwards, H. Favarger, Alfred H. Hart, H. Carter Pegg, Arthur H. Reid, Hugh Stannus, and J. H. T. Woodd; *Associates*: F. Dare Clapham, Harold Goslett, Baxter Greig, and R. Douglas Wells. The Scrutineers met at the Institute at 10.30 a.m. on Friday, the 3rd inst., and the work of going through the 865 voting papers received, and counting the votes, lasted till 8.30 p.m. Mr. Hugh Stannus [F.] acted as Chairman. Their reports having been communicated to the Meeting last Monday, on the motion of the President a very hearty vote of thanks was passed to the Scrutineers for their long and tedious labours. The returns are as follows:—

THE COUNCIL.

PRESIDENT.—John Belcher, A.R.A. [*unopposed*].

VICE-PRESIDENTS (4).—*Elected*: Henry Thomas Hare, 692 votes; Alfred Darbyshire, 641; Thomas Edward Colcutt, 522; Samuel Perkins Pick, 478.

Not elected: Leonard Stokes, 395 votes.

HONORARY SECRETARY.—Alexander Graham [*unopposed*].

MEMBERS OF COUNCIL (18).—*Elected*: Arthur Conran Blomfield, 595 votes; John William Simpson, 580; James Sivewright Gibson, 576; William Howard Seth-Smith, 565; Alfred William Stephens Cross, 535; William Flockhart, 528; Samuel Bridgman Russell, 495; Ernest George, 483; William Gillbee Scott, 466; Butler Wilson, 459; Frederic Richard Farrow, 449; William Henry Atkin Berry, 445; George Hubbard, 442; Lewis Solomon, 442; John Slater, 431; Joseph Douglass Mathews, 423; Charles Edward Mallows, 408; Edmund Woodthorpe, 402.

Not elected: Professor Beresford Pite, 391 votes; Edward William Mountford, 380; Paul Waterhouse, 380; George Frederick Bodley, R.A., 378; John Alfred Gotch, 367; John James Burnet, A.R.S.A., 353; Arnold Mitchell, 344; Edwin Thomas Hall, 343; Edward Augustus Gruning, 339; George Halford Fellowes Prynne, 338; Charles Heathcote, 250; Charles Edward Bateman, 249; Ralph Selden Wornum, 239; William Alfred Pite, 233; Colonel Eustace Balfour, 219; William Edward Riley, 215.

ASSOCIATE MEMBERS OF COUNCIL (4).—*Elected*: William Henry Bidlake, 676 votes; Henry Vaughan Lanchester,

444; Robert Shekleton Balfour, 426; Edmund Wimperis, 387.

Not elected: Percy Scott Worthington, 384 votes; Thomas Edward Pryce, 240.

REPRESENTATIVES OF ALLIED SOCIETIES (9).—*Elected*: George Cappinger Ashlin, R.H.A. (Royal Institute of the Architects of Ireland), 601 votes; Henry Langton Goddard (Leicester and Leicestershire Society of Architects), 600; James William Beaumont (Manchester Society of Architects), 582; Thomas Cooper (Birmingham Architectural Association), 576; Arthur William Brewill (Nottingham Architectural Society), 537; George Bertram Bulmer (Leeds and Yorkshire Architectural Society), 537; John Keppie (Glasgow Institute of Architects), 506; Herbert Davis (York Architectural Society), 494; George Herbert Oatley (Bristol Society of Architects), 473.

Not elected: Arthur Southcombe Parker (Devon and Exeter Architectural Society), 450 votes; John Walton Taylor (Northern Architectural Association), 415; Arthur Clyne (Aberdeen Society of Architects), 332; Edward Jenkin Williams (Cardiff, S. Wales, and Monmouthshire Architects' Society), 311.

REPRESENTATIVE OF THE ARCHITECTURAL ASSOCIATION (LONDON).—Edward Guy Dawber [*unopposed*].

AUDITORS.

Sydney Perks [F.]; Henry Arthur Crouch [A.].

ART STANDING COMMITTEE.

Fellows (10).—*Elected*: Ernest George, 530 votes; Henry Thomas Hare, 528; Thomas Edward Colcutt, 516; Edward Guy Dawber, 476; James Sivewright Gibson, 462; William Douglas Carbe, 441; Edward William Mountford, 409; Sir William Emerson, 407; John Macvicar Anderson, 399; Arthur Edmund Street, 387.

Not elected: John William Simpson, 384 votes; William Flockhart, 383; Paul Waterhouse, 372; William Howard Seth-Smith, 322; George Campbell Sherrin, 212; Herbert Read, 130; Samuel Sebastian Reay, 118.

Associates (6).—*Elected*: Sidney Kyffin Greenslade, 585 votes; Edmund Wimperis, 557; Robert Shekleton Balfour, 536; Henry Tanner, jun., 528; Robert Watson, 518; William Henry Romaine Walker, 510.

Not elected: Stanley Hinge Hamp, 323 votes.

LITERATURE STANDING COMMITTEE.

Fellows (10).—*Elected*: Professor Frederick Moore Simpson, 614 votes; Richard Phené Spiers, 606; Hugh Stannus, 533; Alfred William Stephens Cross, 532; Paul Waterhouse, 515; Henry Heathcote Statham, 492; Charles Harrison Townsend, 481; Charles Edward Mallows, 466; William Alfred Pite, 463; John Bilson, 450.

Not elected: George Halford Fellowes Prynne, 434 votes; Benjamin Ingelow, 396; Francis Hooper, 393; Robert Falconer Macdonald, 352.

Associates (6).—*Elected*: Percy Leslie Waterhouse, 498 votes; Arthur Smyth Flower, 466; Arthur Maryon Watson, 458; Professor Ravenscroft Elsey Smith, 418; Professor Charles Herbert Reilly, 417; Percy Scott Worthington, 414.

Not elected: William Henry Ward, 366 votes; Hubert Christian Corlette, 296; William Adam Forsyth, 282; Walter Ernest Dobson, 182; Frank Lishman, 117.

PRACTICE STANDING COMMITTEE.

Fellows (10).—*Elected*: Joseph Douglass Mathews, 563 votes; Edmund Woodthorpe, 552; William Henry Atkin Berry, 549; William Henry White, 529; George Hubbard, 518; Thomas Henry Watson, 492; Walter Hilton Nash, 476; Thomas Batterbury, 442; Alfred Saxon Snell, 428; Alexander Henry Kersey, 418.

Not elected: Sydney Perks, 408 votes; Ernest Flint, 406; Frederick Ernest Eales, 329; Charles Fitzroy Doll, 298.

Associates (6).—Elected: Max Clarke, 513 votes; Charles Henry Brodie, 510; Augustus William Tanner, 497; Herbert Hardwicke Langston, 421; Thomas Edward Pryce, 413; Edward Greenop, 408.

Not elected: Edwin Richard Hewitt,* 377 votes; Herbert Arnold Satchell, 374; William Charles Waymouth, 349.

SCIENCE STANDING COMMITTEE.

Fellows (10).—Elected: Thomas Blashill, 634 votes; Herbert Duncan Searles-Wood, 617; Francis Hooper, 592; George Hornblower, 585; Ernest Flint, 581; Alfred Saxon Snell, 579; William Edward Riley, 568; Lewis Solomon, 567; Arthur John Gale, 563; Frederic Hammond, 538.

Not elected: Benjamin Tabberer, 531 votes.

Associates (6).—Elected: George Pearson, 555 votes; Max Clarke, 547; Bernard John Dicksee, 540; Henry William Burrows, 500; Edwin Richard Hewitt, 494; Archibald Duncan Watson, 463.

Not elected: Robert Watson, 420 votes; William Jacques, 331.

The Indian Queen Victoria Memorial.

The second number of the "Journal of the Queen Victoria Indian Memorial Fund," dated March 1904, is to hand from Calcutta. The first number appeared in April 1901 [JOURNAL R.I.B.A. 25th May 1901], and the second gives the progress of events since. The project of the Memorial meanwhile has taken definite and concrete shape. A large sum of money, roughly £330,000, has been collected in subscriptions throughout India. The provisional Committee has been replaced by a body of Trustees, created and invested with powers by an Act passed in the Imperial Legislative Council. The Calcutta Maidan has been chosen for the site, Sir Wm. Emerson has been selected architect, his plans have been approved, and work upon the foundations is now far advanced. A photograph reproduction of the accepted design for the Hall is given as a frontispiece to the Memorial Fund Journal. In addition to its main and central purpose of commemorating Queen Victoria, the building is intended to serve as a National Gallery for India, containing memorials of all that has been great or remarkable in her history, whether relating to events or to persons. Sir Wm. Emerson went to Calcutta in February last year, and in the following month Lord Curzon opened an exhibition of the architect's drawings and of the gifts already presented to the Museum.

In a speech on this occasion describing his plans, Sir Wm. Emerson entered into the considerations which had determined the type of architecture to be adopted for the building. It was finally decided that a style, Occidental in character, which however might admit freedom of treatment, and have blended with it a suggestion of Oriental feeling in some details, would best express the sentiment of a Western monarch reigning over such a country as India. It was therefore decided to

adopt Italian Renaissance as best fulfilling these conditions, and in his design, Sir William states, he has endeavoured to give a suggestion of orientalism by the arrangement of the domes and in the details of some smaller features as cantilevers under the cornices, &c., which, while being Italian, might well have some feeling of the beautiful forms found in many parts of India.

As to the plan, to quote Sir William: "A central hall was desired to enshrine a white marble statue representing the Queen in her youth. This I felt should be surmounted by a dome as the principal external and internal feature of the group. Then there were required galleries for the exhibition of sculpture, paintings, arms, trophies, prints, manuscripts, coins, and other things indicative of the connection of the British Empire with India. Also quadrangles were suggested with loggie or verandahs in which, if funds are forthcoming, might be mosaics representing certain historical subjects. Further, a Durbar Hall was asked for, and a Princes' Hall for Rajas' exhibits. . . . The plan is in the form of a capital H, the ends being joined by curved arcading. The cross of the H forms the central hall, and the galleries and durbar the sides.

"There would be staircases at the corners of the dome giving access to the galleries in the Durbar Hall, Princes' Hall, Central Hall, and Vestibule, and to the Curator's Office over the north entrance, also to the top of the dome. At each corner of the building would be a tower some 30 feet square.

"The whole structure will stand on a terrace, some six or seven feet high, extending some forty feet in width all round the building. The north porch will be approached by a grand flight of steps surmounted by the bronze statue of the Queen by Mr. Frampton.

"The whole terrace and building will be faced with white marble from Makrana and Greece, those portions which admit of being easily worked by hand being prepared here of the beautiful Indian marbles, while the other portions that require the use of expensive machinery, which it would be too costly to erect in India, will be procured from Greece. . . . Internally the Queen's Hall will be lined with white marble and coloured panels of Indian marbles and some frescoes or mosaics in the lunettes over the gallery. The other rooms and Durbar Hall will be lined with dadoes and piers of light-coloured Indian stone; and the portions of the walls not stone and the ceilings will be faced with the fine native shell plaster."

Lord Curzon thus pictures the building and surroundings when the architect's conception is realised: "A beautiful and spacious park, in the middle of which will rise the glittering marble structure, standing upon a terrace of white marble and facing northwards across the Parade Ground, with its central dome of white marble soaring into the air to a height of 160 feet, and visible from every part of the river and the Maidan."

* By an oversight Mr. E. R. Hewitt's name was omitted from the list of attendances published in the Supplement to the JOURNAL of the 8th May. Mr. Hewitt should have been credited with eight attendances, having been present at all the meetings held by the Science Committee during the period covered.

As to the construction the soil is better than Sir William anticipated. "There are no soft spots, though there is the difficulty of the blue clay at a certain depth which has to be contended with. The concrete is spread so that there will be 1½ tons on every superficial foot of soil under the concrete at every point. The walls will be of solidly built brickwork faced with marble externally, and marble and stone and plaster internally.

Mr. T. H. Holland, Director of the Geological Survey of India, contributes to the Journal some notes on the Ornamental Building Stones of India, with a map showing their distribution throughout the country; and there is a Report on the Marble Quarries of Rajputana by Mr. R. L. Sevenoaks, Superintending Architect.

The Secretary R.I.B.A. and the Spanish Architects.

The Secretary of the Institute, who was one of the official delegates of the R.I.B.A. at the recent International Congress of Architects held at Madrid, has received the honour of election as Hon. Corresponding Member of the Sociedad Central de Arquitectos, Madrid.

The International Congress of Hygiene at Brussels.

In the Annual Report of the Council, p. 357, omission was inadvertently made of the name of Mr. Thomas W. Cutler [F.] as representative of the Institute, with Mr. John Slater [F.], at the last International Congress of Hygiene and Demography held at Brussels. Mr. Cutler is one of the permanent officers of these Congresses. The report of the Institute representatives was published in the JOURNAL for last October.

Obituary.

Mr. John Goodacre [F.], of Leicester, sends news of the death of his brother, Robert Johnson Goodacre, a past President of the Leicester and Leicestershire Society of Architects, and till recently a Fellow of the Institute, elected in 1882. He retired from practice about four years ago.

William Alfred Royle, of Manchester, whose death is announced, had been a Fellow since 1888. In partnership with the late Mr. Robert I. Bennett he carried out many offices and warehouses in Manchester, and numerous buildings for the Manchester School Board. He was twice elected President of the Manchester Society of Architects.

Mr. ALEX. GRAHAM, F.S.A. (Hon. Secretary), having made the above announcements at the General Meeting last Monday, Mr. S. PERKINS PICK (Vice-President elect) said that Mr. Robert Johnson Goodacre had been for many years one of their leading architects in Leicester. He was highly respected, not only by every member of the profession, but also by the town in general. He was a magistrate for the borough, and had done dignified and useful work. His decease was very

greatly regretted by every member of the profession in Leicester.—Mr. J. W. BEAUMONT [F.] said that, as President of the Manchester Society of Architects, he should like to say that they in Manchester regretted very much the death of their friend Mr. Royle. He was an old Manchester architect, and both he and his partner, Mr. Bennett, who was also a Fellow of the Institute, had died within the last twelve months. Mr. Royle was particularly well looked upon in Manchester as a man of good judgment and very fair in his dealings with everybody he came in contact with. His death was extremely regretted by the Manchester Society.

The late Mr. Birch.

Erratum.—Mr. George Patrick [A.] writes to the Hon. Secretary:—"In the obituary notices in the current issue of the JOURNAL, it is stated that George Henry Birch was the son of the late Dr. Samuel Birch, of the British Museum. Allow me to say that this is not the case. George Henry Birch was an old and valued friend of mine since 1862, when he entered the office of the late Sir M. Digby Wyatt, of whom I was an articled pupil. We became close friends, and in 1863 spent a holiday together in Worcestershire. In speaking of his family I never heard that his father was connected with the British Museum; and my friend, Dr. Walter de Gray Birch, F.S.A., who is the son of the late Dr. Samuel Birch, the Egyptologist, tells me the statement is 'absolutely wrong,' and he would be obliged if you would kindly have it corrected."—[The Editor has to explain that the brief details given in the JOURNAL of Mr. Birch's career were quoted from one of the weekly papers, and he gladly gives publicity to the correction.]

MINUTES. XV.

At a Special General Meeting held Monday, 6th June 1904, at 8 p.m.—Present: Mr. Aston Webb, R.A., F.S.A., President, in the chair, 50 Fellows (including 16 members of the Council), 56 Associates (including 3 members of the Council), and several visitors: the President read the Resolution passed at the Business General Meeting of the 5th March—viz. "That the necessary alterations to the By-laws be drafted and submitted to a Special General Meeting to provide that after the 31st December 1906 every person desiring to be admitted a Fellow shall be required to have passed the Examination or Examinations qualifying him as an Associate, or shall be elected from the ranks of the Associates; but that, in exceptional circumstances, the Council shall have power to dispense with such Examination or Examinations." The President, having stated that the addition to By-law 3 which the Council proposed in order to carry the above Resolution into effect had been approved by the Institute solicitors, thereupon moved, and the Meeting unanimously

RESOLVED, that the following words be added at the end of the first clause of By-law 3—viz.

"After the 31st December 1906 every person desiring to be admitted a Fellow shall be required to

have passed the Examination or Examinations qualifying him as an Associate, or shall be elected from the ranks of the Associates. But in special cases the Council by the votes of three-fourths of such Members of the Council as are present and voting at a meeting of the Council shall have power to dispense with such Examination or Examinations."

The Special General Meeting then terminated.

At the Fifteenth General Meeting (Business and Ordinary) of the Session held at the conclusion of the Meeting above minuted, and similarly constituted, the Minutes of the Meeting held Monday, 16th May [p. 309], were taken as read and signed as correct.

The Hon. Secretary announced the decease of Robert Johnson Goodacre, of Leicester, elected Fellow 1882, and recently retired; and William Alfred Royle, of Manchester, Fellow, elected 1888. Tribute of respect for the qualities of the deceased gentlemen was paid by Messrs. S. Perkins Pick [F.] and J. W. Beaumont [F.] on behalf of the Allied Societies at Leicester and Manchester respectively.

The Hon. Secretary drew attention to a list of books [see Supplement] recently acquired by the Library either by presentation or purchase, and mentioned that during next Session he hoped to make a short statement with reference to the principal works added during the past Session. A vote of thanks to donors of books was passed by acclamation.

The following members attending for the first time since their election were formally admitted by the President—viz. Thomas Dinwiddy [F.], Henry Edmund Davey [A.], and Holland William Hobbiss [A.].

The Secretary having read the reports of the Scrutineers with reference to the election of the Council and Standing Committees, the candidates reported successful were thereupon taken to be duly elected to the various offices.

A vote of thanks to the Scrutineers for their services was passed by acclamation.

Before proceeding to the election of members the President explained that the names of the candidates had first been submitted to the Council, then published in the JOURNAL with a request for any objections to be submitted to the Council within a specified date; that objections received were duly investigated, and if found valid the candidate concerned would be rejected. A Fellow present proposing to raise an objection to one of the candidates, the President ruled that it was not competent to him to do so at that meeting. The election then proceeded and the following candidates were elected members by show of hands under By-law 9:—

AS FELLOWS (18).

THOMAS ARNOLD [Assoc. 1867] (Edinburgh).
WALTER ALBERT CATLOW, Leicester.
MAX CLARKE [Assoc. 1880].
ALLAN OVENDEN COLLARD [Assoc. 1889].
WILLIAM HENDERSON DUNCAN, Rochdale.
EDWARD GOLDIE.
ALFRED HENRY HART [Assoc. 1890].
CHARLES GROVE JOHNSON, Mexico.
WILLIAM CAMPBELL JONES [Assoc. 1888].
WILLIAM ALFRED LARGE.
THOMAS EDWARD MARSHALL, Harrogate.
JOHN CAMPBELL TURNER MURRAY.
JOHN HENRY PHILLIPS, Cardiff.
ALFRED ROBERTS.
WILLIAM RUSHWORTH.
PERCY BURNELL TUBBS.
JOHN COLLINGWOOD TULLY [Assoc. 1882] (Cape Town, S. Africa).
BENJAMIN WOOLLARD [A. 1889].

AS ASSOCIATES (2).

CHARLES ROSENTHAL [Qualified as Assoc., Colonial Exam. Sydney, N.S.W. 1903] (Sydney, N.S.W.)
HERBERT ALFRED HALL [Probationer 1899, Student 1900, Qualified 1903].

AS HONORARY ASSOCIATE (2).

JAMES JEBUSA SHANNON, A.R.A.
LORD STANLEY OF ALDERLEY.

AS HON. FELLOW.

THE RIGHT HON. LORD CURZON OF KEDLESTON,
G.M.S.I., G.M.L.E., Viceroy of India.

Some Notes on the Plenum System of Ventilation, by Mr. Wm. Henman [F.], having been previously issued to members for the purposes of discussion at the Meeting, a further Paper was contributed and read by Mr. S. Perkins Pick, subsequent speakers being Mr. A. Saxon Snell [F.], Dr. Rideal, the Rev. J. B. Lock, Mr. Kaye Parry [F.], Mr. Harold Griffiths [A.], Mr. Alan E. Munby, Mr. Langton Cole [F.], Mr. E. W. Hudson [A.], and the President.

The proceedings then closed, and the Meeting terminated at 10.20 p.m.

REVIEWS.

PAINTING AND DECORATING.

Paint and Colour Mixing: a Practical Handbook for Painters, Decorators, and all who have to mix Colours, containing many Samples of Oil and Water Paints of various Colours, including the principal Graining Grounds, and upwards of 500 different Colour Mixtures. With 8 coloured plates. By Arthur Seymour Jennings, Editor of "The Decorator," author of "Wall Papers and Wall Coverings." Second Edition, re-written and enlarged. 8s. Lond. 1904. Price 5s. net. [E. & F. N. Spon, Ltd., 125, Strand.]

A second edition of this handbook, which architects and builders will find very useful for reference, has been called for within eighteen months of its first issue. The examples of colours, a prominent feature of the first edition, have been increased from 64 to 171, the mixtures in every case being made with actual paint or water colours, not with printer's ink. The fresh matter added includes some valuable notes on colour harmony, a chapter on colours producible by the admixture of various pigments with black japan, and a chapter on the washable and other water-paints now so much favoured. Humane objectors to lead in materials will note with satisfaction the author's pleas for zinc white or zinc oxide instead of white lead. First, it is non-poisonous; then it is beautifully white—an important factor in paint-mixing, as the purity of the original colour is retained, whereas the yellowish cast of lead to some extent destroys the colour it is mixed with. Zinc white, too, has considerable body, is economical in use, and will last twice as long as lead, especially in large cities, where the air is impregnated with sulphur from burning coal. The average "decorator" of the suburban house takes little count of the laws of colour harmony; he

is either venturesome to audacity in his defiance of them, or else is too timid to hazard anything at all in the way of colour contrasts. It would, of course, be good for him to cultivate a taste for harmonic colouring, and think out schemes for himself. Failing this, however, he can go to Mr. Jennings' book and get, cut-and-dried, a correct colour-scheme without any thinking at all. Mr. Jennings might further suggest to him that the effect of the cornice in a room would be greatly enhanced if it were treated as part of the wall—not as part of the ceiling, as seems to be the rule in modern practice.

ALLIED SOCIETIES.

CARDIFF, SOUTH WALES, AND MONMOUTHSHIRE SOCIETY.

Professor Beresford Pite on Registration and Education.

The Annual Dinner of the Cardiff, South Wales, and Monmouthshire Architects' Society was held at the Royal Hotel, Cardiff, on 19th May, the President, Mr. Jenkin Williams [F.], in the chair. The guest of the evening was Professor Beresford Pite [F.], and among other visitors were Mr. W. Henry White [F.] and Mr. E. Harding Payne [A.].

Professor Beresford Pite, in responding to the toast of "The Royal Institute of British Architects," expressed his pleasure at revisiting South Wales, where he had commenced his professional training, nearly thirty years before, in the office represented there by his friend the Treasurer, Mr. E. H. Fawckner, and thanked Mr. Seward for the terms in which he had proposed the toast, and for the opportunity he had given for an allusion to current professional politics. He much feared, he said, that political discussion was taking the place of architectural enthusiasm among them, and that the spirit of emulation in the art of design would suffer if interest was so largely devoted, as of late, to matters which ultimately were those of personal and professional advancement only. It would be admitted by all, he hoped, that the increasing beauty and interest of their buildings would be a valuable aid towards obtaining proper recognition and respect from the public, and from public bodies. Such a view of the situation, too, would relieve them of merely local considerations in such a matter as confining local work to local architects only. This would be desirable and possible where a defined and characteristic school of local architecture existed; but, personally, after their delightful visit that afternoon, he could not but be thankful that Cardiff Castle was not designed by a Cardiff architect, and that William Burges had been given

the opportunity of conferring lustre upon their town by creating within it a work of art which for many generations would make it a notable example of the splendid architectural attainment of the best period of the Gothic revival. He wished to assure them that no spirit of local narrowness animated the Institute Council in London, and instanced the recent nomination lists for candidates for the selection of an architect for the additions to the British Museum in London, in which the Council placed seven provincial architects and seven non-members of the Institute among those upon whom they proceeded to vote. As Mr. Seward had given him the opportunity, he would remark how much he thought the recent propaganda in connection with the election of the Council was to be regretted. Apart from the merits of registration, or of a Registration Bill, he considered it an unwise policy on the part of those who were in favour of such a movement, while the large and representative committee appointed at the Special General Meeting was sitting, to issue a declaration which, if signed and acted upon as requested, could only have the effect of splitting the profession into two opposing camps. If there was one question more than another upon which it was necessary to unite rather than to divide the profession, it was certainly upon one in which architects proposed to appeal to Parliament. The method of dividing the profession into rival lists, or camps, would not only render useless and futile the labour of the Representative National Committee appointed by the Institute, but also consolidate that opposition which was so largely felt, and felt by those who most really represented the artistic feeling for architecture as an art, in the face of which opposition no progress whatever could be made. Let this become a matter upon which the profession could be united by reason, by interest, and by common devotion to the art which it practised, rather than one which divided invidiously into rival camps, and produced irreconcilable party warfare. The Institute Committee was sitting with a *bona fide* purpose of considering the whole matter thoroughly, and of reporting to the general body, and until it had completed its work, suspension of forcible expressions of opinion and of committals on both sides was desirable and necessary. He would mention in this connection the important fact that a Bill in the promotion of which the Council of the Institute assisted had now been introduced into Parliament for the legal protection of the titles of chartered societies, the effect of which was that the Institute initials of diploma would be protected from use by improper persons who were not entitled to them, such prohibition not existing at present. This measure would strengthen the position of all members of the Institute, and was an important step towards the proper recognition of the architect's status as a member of his chartered society. Referring to

the alliance of the Provincial Societies with the Institute, Professor Pite emphasised the importance of making the central body of the profession representative in order to give weight and effect to its action. An increased membership alone would ensure this; and as there were over 1,000 members of Allied Societies who were not yet members of the Institute, it was a primary matter that as many as were eligible should at once apply for the Fellowship, and that the rest should qualify for the examination. He cordially believed that the strengthening of the Institute and the inclusion within its ranks of all good architects was the best and at present the only policy which would be of value to the profession. The Institute was a body charged to promote the art of architecture, and necessarily and incidentally the interests of its practitioners by mutual fellowship. Architecture was an art which appealed to, claimed, and found success in winning the attention and appreciation of the world, and no appreciation was more valued by the architect than that of his cultivated brethren; and a sense of their fellowship in its practice, with their comprehension of the difficulties and limitations which attended present-day efforts to attain a high standard of design and construction, was of the greatest value. This fellowship of artistic sympathy, to a certain extent, could only be found within such a body as an Institute of Architects. There were also the more difficult matters connected with the maintenance of a high standard of professional conduct as between architect and architect and towards clients and the public. The delicate questions that arose in these matters could be better considered and dealt with by the small "Professional Questions" Committee of the Council of the Institute than by any other body. The judgment of independent professional brethren sitting in London could in these matters be of especial value to provincial architects, and in many cases such a committee was able to offer advice and help which would not be obtained from a formal or more distinctly judicial tribunal. Professional interests needed in the matter of competitions such active and intelligent watching as could best be obtained by the action of the central body of the profession. He appealed to all members of the Allied Societies at once to put before the promoters of any competitions of which they had private knowledge the Institute paper of Suggestions for the Conduct of Competitions. If promoters objected to interference it should only be necessary to point out that the inauguration of a competition implied a great amount of labour and expense on the part of many architects which the promoters often were in complete ignorance of, and that it was most proper and advantageous that the Suggestions of the central body for the protection of its own members in the expenditure of their time, thought, and labour, unremuneratively

in the vast majority of cases, should be complied with, and that unless an agreed standard of regulation in their conduct was accepted architects of ability and high standing would not submit designs, and the ultimate result must be that only second-rate men would enter these competitions. The services of the Institute were also much needed for pressing upon municipalities and public bodies the just claims of architects within their own districts, and generally for consideration in the disposal of commissions for public works. While willing to overlook and forgive much professional want of qualification or other training in anyone who could and did produce a beautiful building, there being no narrowness in any true view of artistic qualification, it was essential to the honesty of public life and in the true interests of the community to insist that they, as architects, had a right to protest against a municipal engineer or surveyor professing, or being employed, to design or carry out public buildings which all the time were being done for him by some talented but inadequately paid and improperly recognised architectural assistant or "ghost" upon his salaried staff. The principal work of the Institute had of recent years been the establishment of the examinations, and it had now become necessary to carry its work beyond the examinations to the education preparatory to and presupposed by them. This perhaps had been better undertaken years ago, but an important Education Committee had been sitting for the purpose of agreeing upon a scheme of architectural education which would be available for all students, and form a guide to more teaching bodies which were so rapidly taking up architecture as part of their course, and be of assistance to those newer Universities that contemplated bestowing degrees in architecture. The importance of bringing these great bodies into line with the central body of the profession was very evident. The constitution and work of this Education Committee upon which sat representatives of the colleges where architecture was at present taught, including the very distinguished Principal of the University of London, augured well for the success of their work, and he ventured to impress upon his hearers that education was now the prime matter of importance in the question of an architect's status, and that any hasty steps now, while a complete educational scheme was immature and almost non-existent, would be dangerous, and hinder for many years proper progress upon those lines in which the Institute could effectively assist. In conclusion, Professor Pite urged them to remember in all the controversy of the hour that architecture was more than a profession; it was an art that called for a high standard of intellectual culture which it was theirs to express in their buildings, and by that alone would they justify individually their claim to the honoured title of architect.



A. Choisy

AUGUSTE CHOISY,

Inspecteur-Général honoraire des Ponts et Chaussées, Paris.

ROYAL GOLD MEDALLIST 1904.



THE ROYAL GOLD MEDAL.

Presentation to M. AUGUSTE CHOISY [*Hon. Corr. M.*], 20th June 1904.

ADDRESS BY MR. ASTON WEBB, R.A., PRESIDENT.

LADIES AND GENTLEMEN,—

IT is, I think, a happy custom of the Royal Institute of British Architects to wind up its session by the most interesting event of its year, viz. the presentation of His Majesty's Gold Medal; and when (as to-night) the recipient attends in person to receive it the interest and distinction of the occasion is further increased.

This Medal, as you all know, is given by His Majesty, who graciously allows the Institute to recommend a recipient for His Majesty's approval, and it has become a custom to select one year an English architect, the next a foreign architect, and the third a literary man whose work has made for the advancement of architecture. This year, accordingly, we considered the claims of literary men for this high honour, with the result that the Council and the general body of members of the Institute unanimously decided to recommend to His Majesty M. Auguste Choisy as the recipient of the Medal; the royal approval was graciously granted, and M. Choisy is here this evening to receive the Medal at our hands. There are no such things as politics recognised in this Institute, but I may perhaps be allowed to say that it is an event of happy augury that our choice should have fallen upon a Frenchman at this particular moment when our relations with that great and illustrious country are so friendly, and also that we have been able to come as unanimously to an agreement on the selection of a Royal Gold Medallist as France and England have recently been able to do on matters connected with the highest State interests of these two great countries.

We are further honoured this evening by the presence of a distinguished representative from the French Embassy in London, the Comte de Manneville, placing as it were the official seal of approval of that country on our choice; and I cannot as your President let this occasion pass without expressing on your behalf, and my own, our unbounded admiration for the great band of artists in that country and the works they have produced in all materials for centuries. In architecture we recognise that they are still working on traditional lines, but at the same time in the modern spirit, and the close alliance of architecture, painting, and sculpture, as shown in their buildings, fills us with sincere delight and the highest respect and esteem.

It is, as you know, by no means the first time that we have recognised the genius of a Frenchman. This Medal was awarded, in 1855, to M. Hittorff; 1861, M. Lesueur; 1864, M. Viollet-le-Duc; 1867, M. Texier; 1876, M. Duc; 1879, the Marquis de Vogüé; 1886, M. Charles Garnier; 1892, M. César Daly; but none, I think, has done more towards elucidating the

modes of construction employed by the ancients than our guest of to-night, M. Auguste Choisy.

I could wish that the honourable duty of laying before you some short account of the work of M. Choisy were in more capable hands than mine, for I can make no claim to archaeological learning which would justify me in presuming to review his work. It lies before you on this table to-night—some seven volumes, small in bulk, gigantic in labour, thought, and result. The names of these works have made M. Choisy famous wherever interest in such subjects is taken. They are *L'Art de bâtir chez les Romains*, 1873; *Le Sahara*, 1881; *L'Art de bâtir chez les Byzantins*, 1882; *Etudes Épigraphiques sur l'Architecture Grecque*, 1883; *Histoire de l'Architecture*, 1898, and *L'Art de bâtir chez les Egyptiens*, 1903, together with other smaller works. The first of these great works therefore was *L'Art de bâtir chez les Romains*, published in 1873; the last, *L'Art de bâtir chez les Egyptiens*—which, as one may say, has put a crown to M. Choisy's life work—was published so recently as last year.

In the Art of Building among the Romans, M. Choisy (and I am indebted to Professor Aitchison and to our Secretary, Mr. Locke, for much of this information) first introduced us to the Roman search for an economical method of building vaults and domes. Alberti had already discovered how walls were built by the Romans, but he went no further, and the great marvels of the building of vaults and domes were still undiscovered. He has shown us, amongst many other things, how experience enabled the Romans to abolish the open net-work which kept the green centering in place, and how to adapt a single brick for the thickness of these great vaults of eighty feet span by inserting pieces of a second course to secure the corners at the junction, and by using the rubble or concrete filling in horizontal courses, the means probably adopted to equalise the pressure in the dome of Hadrian's Pantheon; all this is clearly shown in M. Choisy's illustrations. In his Art of Building among the Byzantines he shows how the Romans, with diminished means, were enabled to build vaults without centering.

M. Choisy's great work, the History of Architecture, is a masterly exposition of the treatment of a subject from a single point of view. The result of fifteen years' strenuous labour, it is the history especially of architectural construction from the earliest times to the present. The innumerable line illustrations are nearly all the work of his own hands, drawn for the most part in isometric perspective in the inimitable manner of the French draughtsman.

In his Art of Building among the Egyptians he has developed the theories set forth in the Egyptian section of his history, and concludes his researches into the methods employed for centering their great arches and in lifting their great monoliths.

His work on Greek Inscriptions contains a series of studies in Greek inscriptions in the Arsenal of the Piræus, and the walls of Athens, and the Erechtheum. A marble slab was discovered with a complete specification for the building of the Arsenal.

A noticeable point in M. Choisy's work is the clearness and conciseness of his style; for M. Choisy puts in three lines what many would have taken three pages to describe.

From this necessarily brief and incomplete account of M. Choisy's works, you will see that they are not merely historical accounts and records of buildings, but are the result of entirely original research and thought; and are, I take it, intended also to make the reader think out things for himself. They should be especially interesting to us English architects who are about to consider the question of architectural education, especially in connection with construction as the basis of design. For it is on account of these invaluable scientific researches into the history of architectural construction contained in these volumes that we are here to present M. Choisy with the Royal Gold Medal to-night.

Perhaps M. Choisy will permit me to give a few personal details of his career. Born at Vitry-le-François, 7th February 1841, he early derived his taste for architecture from his father, an architect; and he was from the first struck by the relation between the scientific study of construction and the art of architecture. He entered the École Polytechnique and studied under Leonce Reynaud. In 1863 he joined the Government Department of the Ponts et Chaussées, where he was for many years Engineer-in-chief, but has now retired with the title of Inspecteur-Général honoraire des Ponts et Chaussées. After the publication of his first book, *The Art of Building among the Romans*, his conclusions were felt to be so startling that, through the medium of Reynaud and Viollet-le-Duc, he was sent on an architectural mission to apply the same system of investigation to the architecture of the Byzantine Empire.

For many years M. Choisy was a professor at the École des Ponts et Chaussées and at the École Polytechnique. In 1870, M. Choisy fought for his country in the terrible war of that time. In 1889 he was elected an honorary member of this Institute.

M. Choisy, allow me, on behalf of my colleagues of this Institute, myself to congratulate you on the production of these epoch-making works and the honours you have received, and at the same time, as President of the Royal Institute of British Architects, to present to you this Gold Medal conferred by His Most Gracious Majesty the King on the unanimous recommendation of your British *confrères*.

I trust that you may long be spared to enjoy the honours which have been the result of your loving and unsparing labours in the exposition of the great art of architectural construction.

M. CHOISY'S REPLY.

MR. PRESIDENT, LADIES, AND GENTLEMEN,—

I SHOULD be happy to express to you my gratitude in the language of your great nation, if I felt myself equal to it; but, unfortunately, I do not feel competent; so I shall ask you to allow me to give it in French.

La récompense que j'ai l'honneur de recevoir de vos mains, Monsieur le Président, dépasse toutes mes ambitions, et les témoignages de haute sympathie dont vous avez bien voulu l'accompagner me la rendent plus précieuse encore. L'annonce d'une telle distinction m'a semblé un rêve. Il m'a fallu relire le vote si bienveillant de l'Institut Royal, relire la sanction suprême dont Sa Majesté a daigné le revêtir; il m'a fallu vaincre le profond sentiment de mon insuffisance, pour arriver à me convaincre que je pouvais être le titulaire de la Royal Gold Medal, pour penser que mon nom allait être inscrit à ce Livre d'or où figurent tant d'hommes illustres, la gloire de l'art britannique, et cette élite d'artistes auxquels l'Institut Royal tend une main confraternelle, sans égard aux nationalités et aux distances.

C'est un admirable trait de cette noble et libérale institution de savoir ainsi s'élever au-dessus des distinctions de frontières ou d'écoles, et grouper en une grande famille ceux que rapproche la communauté des aspirations et le désir d'agrandir le patrimoine de l'art.

En ma qualité de Français je suis doublement fier de l'honneur que je reçois: j'y vois un nouveau et éclatant témoignage des franches sympathies qui règnent entre votre nation et la mienne; j'y vois l'expression touchante des sentiments que la population française a chaleureusement manifestés à Sa Majesté Edouard VII dans une visite à jamais mémorable: ce sont les sentiments mêmes dont témoigne par sa présence le digne délégué du Gouvernement français, que je suis heureux de saluer dans cette enceinte.

Mes chers collègues, si je ne craignais d'abuser de votre trop indulgente attention, j'aurais

plaisir à réveiller ici quelques souvenirs qui comptent parmi mes meilleurs, parce qu'ils font remonter bien haut les relations entre l'Institut Royal et celui qui lui exprime en ce moment son attachement sans réserve et sa profonde gratitude.

Avant tout, le souvenir de l'illustre et si regretté Penrose :

J'osai, devant sa tombe même, rappeler l'émotion respectueuse que je ressentis en apercevant, grâce à des fouilles postérieures à ses travaux, les courbes de la plateforme de ce Parthénon qui est l'impérissable monument de sa gloire. Mon premier mémoire fut un hommage à votre immortel architecte ; et aujourd'hui la récompense dont l'Institut Royal m'honore grandit encore à mes yeux quand je songe qu'un tel homme l'a comptée parmi ses titres.

Si l'Institut Royal fut le promoteur de mes recherches, un de ses membres dont l'amitié m'est chère en fut un des premiers confidents : M. Phené Spiers a bien voulu, dans votre JOURNAL même, consacrer une allusion charmante à ces féconds entretiens d'Athènes, où j'ai tant appris et puisé tant d'encouragements.

Un souvenir encore :

Presque enfant, feuilletant les livres de la bibliothèque de mon père, j'eus la bonne fortune de rencontrer le Mémoire du Révérend Robert Willis sur les voûtes du moyen âge. Ce fut une révélation : C'est ainsi, me dis-je, que les formes doivent être analysées ; c'est ainsi que le dessin doit exprimer la structure. Et, lorsque j'essayai de résumer les procédés romains, j'eus sans cesse présent comme un modèle de méthode ce mémoire sans précédent, qui marque à la fois les débuts et le dernier terme de la critique architecturale.

Ainsi, dès mes premiers essais, c'est le mouvement imprimé par l'Institut Royal que j'ai suivi : l'impulsion était votre ; c'est à l'Institut Royal que je dois l'hommage des travaux dont il fut l'inspirateur.

Maintenant, Messieurs, l'honneur dont vous me comblez m'engage, et je tiens à reconnaître devant vous les obligations qu'il m'impose : tant que mes forces ne me trahiront point, j'aurai à cœur de répondre à un tel encouragement. Je voudrais éclaircir quelques points de cette théorie de l'art antique dont Vitruve est l'interprète ; et, ici encore, pour mener à bien l'entreprise, je compte sur les lumières d'un maître pour qui Vitruve est l'objet d'un culte et dont les œuvres sont un reflet de l'hellénisme, M. le professeur Aitchison, mon éminent et vénéré ami.

Pardonnez-moi, Messieurs et chers collègues, d'avoir parlé si longuement de moi-même ; mais j'aurais cru manquer à la reconnaissance en négligeant de rappeler ce que je dois aux influences britanniques : aux membres de l'Institut Royal qui m'ont ouvert la voie, à ceux qui veulent bien m'y soutenir et m'y guider.

La distinction que je viens de recevoir couronne avec un éclat inespéré la plus longue partie de ma carrière ; dans le chemin qui me reste à parcourir je crains moins les défaillances : il me suffira de lever les yeux sur la Royal Gold Medal pour me rappeler jusqu'à la fin qu'il me reste de sérieux devoirs à remplir, de nouveaux efforts à tenter si je veux parvenir à m'en rendre moins indigne.

Monsieur le Président et mes chers confrères, encore une fois et de tout cœur, merci.

PROFESSOR AITCHISON, R.A.—Our accomplished President has asked me to say a few words about my friend M. Choisy. In the year 1873, M. Choisy's *Art of Building among the Romans* was published. I then belonged to a small Architects' Club called "The Foreign Architectural Book Society," best

known by its initials, and called F.A.B.S. I read through this treatise of M. Choisy and said to myself, Here is the Columbus of Roman building, who, after examining all the Roman work within his reach, has formulated a clear exposition of the methods of Roman construction, and, to some

extent, their causes; and I determined to make the acquaintance of the author. And as I found our friend M. Chas. Lucas knew him, I invited him to see me, and found him one of the most polite of French gentlemen, though politeness is a common gift of our friends the French. What was so extraordinary was the care M. Choisy had taken to carefully observe all the factors and to deduce all the results from the causes observed. The spans of the great Roman vaults are generally eighty feet, and it was necessary to make a frame-work of rigid material before the centering, which was green, shrank and twisted; and this was at first done by a layer of Roman bricks stiffened by upright bricks, making coffers, and filling them with concrete or small rubble; but after some experience it was found that one brick laid flat with pieces of brick over the angles was enough, and that the concrete could then be safely laid in horizontal courses from both sides, and the thickness of the concrete when finished was from five to six feet. If rapidly done there was an outward pressure, which was resisted by flying buttresses of brick at the Basilica of Maxentius. There was still the enormous dome of the Pantheon, 142 feet in diameter, to consider—at least as old as the time of Hadrian; for M. Chedanne found, from the foundation to the summit of the dome, that the bricks had the stamp of Hadrian upon them. Apollodorus of Damascus, the Architect of Trajan, was probably the architect, and owing to settlements in the green work discharging arches had to be introduced. I need only point out that the Roman methods had not been found out by the piercing intellect of Alberti, and we know from the debates about the dome at Florence, as given us by Vasari, that it was commonly believed that the dome of the Pantheon had been built on a mound of earth, in which pieces of money had been left, so that the earth might be carried away without expense. There are no devices still used in primitive countries that have escaped M. Choisy's vigilant eye. He has published, besides his professional works, a charming book on the Sahara, the African desert, and on Asia Minor. I think we ought not to forego our thanks to our accomplished President for enrolling M. Choisy at last among that brilliant list of the distinguished architects and archaeologists of all the civilised countries of the world; and I tender my warmest congratulation to M. Choisy on the honour of receiving H.M. the King's Gold Medal, which he

has so well merited, and hope he may live long to enjoy it, and to give us and the world still further proofs of his industry and penetration.

Mr. R. PHENÉ SPIERS [F].—I did not know I should be called upon to speak this evening, but it is a very great pleasure to me to know that a *confrère* whom I met, I am afraid, nearly forty years ago, and who at that early period had already shown extraordinary proofs of his genius, should come forward to receive the Gold Medal at the hands of the Institute. I remember distinctly the first time I met M. Choisy. It was intensely hot weather, in August, in the Theatre of Bacchus, and it was very dry work. The Theatre had only lately been discovered. For years all the archaeologists had pondered over its possible position, and it was not, I think, till a year and a half or two years before I was there that some excavator happened to light on the pavement. I recollect this more especially because when I brought my drawings over here they were exhibited downstairs, and one of our older members, Professor Donaldson, saw for the first time that which he had dreamt of in his youth—that is to say, my drawings were the first drawings of the Theatre of Bacchus, for which he had long sought the traces. It was in this Theatre in 1866 that I first met M. Choisy. I was measuring the plan, and he was making researches; we discussed various theories, and I found in my note-books when I looked at them years afterwards an entry to the effect that I met—I did not know who he was then—a French gentleman on the site who seemed to have the most wonderful theories on every possible subject. On the following day I met M. Choisy again, and then I found he was a member of the French School at Athens, and we then had long talks about the acropolis. I know M. Choisy's works very well, and value them greatly. *L'Art de Bâtir chez les Romains* I have studied with the greatest possible interest. It was followed by the Byzantine work, but I think the one which filled me with the most delight was his clear and exact reading of the specification of the Arsenal of the Piræus. One of the subjects of which we know very little, unfortunately, is the method by which the Greeks constructed their timber roofs. We have only the sinkings which the joists or beams ran into to guide us as to the size of those timbers, and as regards their construction we know scarcely anything. But that specification was discovered in 1882, when M. Choisy translated

it, and made a conjectural restoration. It is open to anyone to compare M. Choisy's translation, or translate it himself if he likes, and then see his interpretation of it in the admirable restoration he has made. It is plain to everyone; no one has contested it, and it was accepted at once as the only true interpretation. His studies on the roofs of the Erechtheum are also of extreme value and interest, and for all these subjects we are greatly indebted to M. Choisy. But he has, in addition to that, published a work which it takes a very long time to follow and to understand, because of the enormous range which it covers. His *History of Architecture*, ranging from the earliest times down to the century before last, is a most extraordinary work. In those two modest volumes he gives a history which might have taken thirty or forty volumes. It is a most astounding work, and I sincerely hope it will be translated into English; it will form a standard of exceptional value, because at every moment it sets the student reasoning for himself in order to follow his conclusions. That is one of the chief values in education; we want men to reason for themselves and not simply to accept theories and formulæ.

Sir L. ALMA-TADEMA, R.A.—Mr. President, Ladies, and Gentlemen: It is difficult to avoid looking back at the experience of one's life. Already, three years ago, I could say that I had exhibited my work to the public for half a century, and such a long period of observation leads one sometimes to think matters over, formulating opinions. Thus I have often thought of that great dispute between theory and practice, which was so acute in the years of my beginning, but

was still more acute in the time of Goethe, who used to say: 'Grün ist der Lebensbaum, grau ist alle Theorie.' It was then believed that practice was practice, and that theory was profession. (*Laughter.*) Well, I am happy to say that those days are past, and that theory without practice, and practice without theory, are no longer considered possible; indeed, we see in this country that technical education is gaining ground, and that no theoretical principle can be kept up if it is not supported by practical experience. This state of things has been reached little by little; men have come forward, such as Quatremère de Quincy in the beginning of last century, who, starting from a basis of practical experience, explained the chryselephantine sculpture, and reconstructed Pheidias's Jupiter Olympius, opening the field to a better understanding between practice and theory. Then came Viollet-le-Duc; and then, finally, our friend here, who never proposed a theory that had not sound practice at the back of it; and that is the reason why all the theories he puts forward are reliable ones, because they are practical. I have profited much by his books, and especially his *L'Art de Bâtir chez les Egyptiens*, and I find it simply delightful, because it is so clear and so thorough that at every word I said to myself: 'Well, why on earth didn't you think of it yourself?' (*Laughter.*) Do not you know that is the best proof of the value of a book? Well, Mr. President, Ladies, and Gentlemen, I cannot say anything more than that I am grateful to M. Choisy for all that he has done for us, and that I hope there is still another volume in store. I am greedy! (*Applause.*)



9, CONDUIT STREET, LONDON, W., 25th June 1904.

CHRONICLE

The Board of Architectural Education

The Board of Architectural Education has been appointed as follows:—

Chairman.—Mr. Aston Webb, R.A., F.S.A.

Vice-Chairman.—Mr. Basil Champneys.

Hon. Secretaries.—Messrs. Reginald Blomfield and John Slater.

Members.—Institute representatives: Messrs. John Belcher, A.R.A., Ernest George, Alex. Graham, F.S.A., Professor Beresford Pite, Professor F. M. Simpson, and Leonard Stokes. Architectural Association representatives: Messrs. E. Guy Dawber and H. T. Hare. Other members: Messrs. W. R. Lethaby, Mervyn Macartney, Ernest S. Prior, and Halsey Ricardo.

Advisory Members.—Representing the
 Royal Academy: Mr. T. G. Jackson, R.A.
 London University: Mr. Sidney Webb.
 London County Council: Mr. Lewen Sharp.
 University College: Professor E. A. Gardner.
 Liverpool University: Professor C. H. Reilly.
 Manchester University: Professor Capper.
 Leeds: Mr. G. Bertram Bulmer.
 Birmingham: Mr. Thomas Cooper.
 Dublin: Mr. J. H. Webb (President Architectural Association of Ireland).
 King's College, London } one representative of
 Edinburgh } each.
 Cardiff }

The first matter referred to the Board, with a view to the consideration of the various schemes of architectural education throughout the United Kingdom, is to draw up and submit to the Council a uniform scheme of Architectural Education, and to approach the recognised institutions of architectural training with a view to its general adoption. The Board has full power to conduct negotiations for the purposes of this reference, but not to commit the Institute to any expenditure without special resolution of the Council.

Further particulars are given in the JOURNAL for 21st May, p. 395.

The Penrose Memorial at St. Paul's.

The memorial to Mr. Penrose in the crypt of St. Paul's was unveiled on Saturday, the 18th June, the Institute being represented by the President, the Hon. Secretary, the Secretary, and numerous members of the Council and of the General Body. Among others present were Dr. Penrose and Miss Penrose. Monsieur Choisy [*Hon. Corr. M.*], then just arrived in London for the purposes of Monday's investiture, was also present and rendered homage for his countrymen. The ceremony of unveiling was performed by Sir L. Alma-Tadema, R.A. [*H.F.*], and at the dedication service which followed the Dean of St. Paul's officiated. The memorial, which has been raised mainly by the subscriptions of members of the Institute, consists of a mural tablet in marble, bearing the following inscription:—

TO THE MEMORY OF

FRANCIS CRANMER PENROSE,

D.C.L., LL.D., F.R.S., F.S.A.,

KNIGHT OF THE ORDER OF THE SAVIOUR IN GREECE;

FOR FORTY-FIVE YEARS SURVEYOR TO THIS FABRIC;

PRESIDENT OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

FROM 1894 TO 1896; ANTIQUARY TO THE ROYAL ACADEMY;

ARCHITECT, ANTIQUARY, AND ASTRONOMER; A PROFOUND SCHOLAR;

AUTHOR OF "THE PRINCIPLES OF ATHENIAN ARCHITECTURE,"

WHOSE DISTINGUISHED SERVICES IN REVEALING THE REFINEMENTS

OF GREEK ARCHITECTURE ARE HERE COMMEMORATED

BY HIS PROFESSIONAL FRIENDS AND ADMIRERS.

BORN 29TH OCTOBER 1817. DIED 15TH FEBRUARY 1903.

Prior to the unveiling of the tablet the following speeches were delivered:

MR. ASTON WEBB, R.A., *President.*—This simple tablet, to the memory of Francis Cranmer Penrose, has been put up mainly, if not entirely, by members of the Royal Institute of British Architects in memory of a dear friend and much-respected President. We feel sure there could be no more fitting place for this tablet than the crypt of the noble building to the care of which Penrose devoted so great a portion of his life. The Dean and Chapter, when applied to, readily gave their assent, and when Mr. Somers Clarke, Penrose's successor, offered this site, I felt none could be more appropriate. On the other side of the wall is the tablet put up to the memory of Christopher Wren, and I felt that what was suitable for Wren must be suitable also for Penrose, and my Council endorsed this opinion. Simple and unostentatious this tablet is, for Penrose's life was simplicity and unostentation itself. The remains of Wren lie below the tablet, while those of Penrose rest in the quiet churchyard at Wimbledon, by the side of his wife, who died only a few days before him. We have asked Sir Lawrence

Alma-Tadema to unveil the tablet. We know of none more distinguished in art, none more distinguished by his knowledge of the buildings of the period Penrose studied, nor one who has done more to recreate for us the men and women who occupied those buildings. I, therefore, on behalf of the Royal Institute of British Architects, beg to ask Sir Lawrence to unveil the tablet.

Sir L. ALMA-TADEMA, R.A. [*H.F.*].—The unveiling of the monument before you is an occasion on which I am permitted by the Dean to speak a few words concerning the distinguished man to honour whose memory we are to-day gathered together—Francis Cranmer Penrose, to whom we are indebted for so much of what we now know of the greatness and completeness of the Greek art of architecture. We all remember with proud affection the devoted student of the glories of the Parthenon, whose kindly smile was always ready for those who loved the art of Greece; it was a smile strangely akin to that which the early Greeks delighted to render, and which still beams upon us from the faces of their statues; a smile full of dignity, of calm, and of sweetness, that spoke of deep convictions, of set purpose, of high aims unflinchingly pursued. At the Royal Institute of British Architects we always called him our Athenian: and such he truly was, having given the greater part of his life to the study of the beautiful as revealed in the art of a people whose essential aim was the pursuit of plastic beauty. The art of the Athenians had been studied in their masterpieces for many centuries, but it was the patient seeker to whom this memorial has been raised who finally laid bare the principles of Athenian architecture. His sense of beauty and deep mathematical knowledge combined led him by minute and laborious research to discover what subtle laws governed the apparent simplicity of the Greek ideals. His accurate measurements revealed to us how far the Greeks had gone beyond the use of the straight line into comprehension of the hidden curve. We now know, for instance, that the lines of the base of the Parthenon were curved in order to appear straight, and that columns on the same plane were made different in size in order to create a more perfect and harmonious impression of uniformity. Penrose had reached his ultimate love and knowledge of perfection in architecture by measured stages. In early youth he had gone through Europe, studying deeply as he went. Starting as a lover of the Gothic and following up through the Renaissance, he ultimately found the source and goal of perfection in Athens. His wide erudition and scientific attainments had already made him a judge capable of passing judgment. We are indebted to him for more than can be acknowledged in the course of these few words, necessarily limited. It was he who directed the strengthening of the Parthenon after the earthquake of 1894. His knowledge of

astronomy led him to make valuable researches concerning the orientation of ancient temples; and work of the highest importance being done to-day in Greece by a band of young excavators, who have, among other achievements, caused Crete to yield her buried treasures, is directly due to Penrose, through whom the British school of archaeology at Athens came into being. But it was not in Greece only that he was called upon to enrich the world by his effort of learning. In 1852 he was appointed surveyor to the fabric of St. Paul's Cathedral by Dean Milman, and to this charge he devoted himself with loving care for nearly half a century. Many works, executed all over the country, speak for his busy life. He was elected Fellow of the R.I.B.A. in 1848, and secured the Royal Gold Medal of the Institute in 1883, becoming its President in 1894 for two years. His contributions to the literature of the Institute were numerous and of the highest interest, including subjects that ranged from Stonehenge and the Temple of Jupiter Olympius to St. Paul's Cathedral. It confers a blessing, as it were, to consider the life of a great man; for above and beyond his own personal achievements the seeds of earnest endeavour sown by him remain fruitful through an indefinite future. It is with thoughts of gratitude for the long and honourable life of Francis Cranmer Penrose that we stand here together and that I now commit this memorial to the charge of the Dean and Chapter of St. Paul's Cathedral.

M. AUGUSTE CHOISY [*Hon. Corr. M.*]: Après l'hommage suprême qui vient d'être rendu à l'illustre Penrose par deux des plus éminents représentants de l'art britannique, qu'il me soit permis de me faire l'interprète des sentiments d'admiration et de regrets que ce grand homme laisse non seulement parmi mes compatriotes, mais parmi les architectes de tant de nations que l'Institut Royal associe si libéralement à ses travaux et à ses honneurs, et qui forment dans l'univers entier comme une grande famille. Pour cette famille Penrose était un chef vénéré, un père; sa perte a été un deuil: mais tous se rencontrèrent dans cette consolante pensée, que la reconnaissance due à l'illustre architecte durerait autant que le culte même de l'art classique. En nous révélant les courbes du Parthénon Penrose nous a initiés au plus délicat des secrets de l'hellénisme; son nom est désormais inséparable de l'histoire de l'architecture athénienne; et, à côté de l'inscription si touchante que l'Institut Royal lui consacre aujourd'hui, le Parthénon lui-même est devenu l'immortel monument de Penrose. Oserai-je, en face de cette tombe, évoquer un souvenir personnel? Lorsque Penrose releva le Parthénon, les degrés de la plateforme étaient encore enfouis. Une fouille, dont je n'avais même pas le mérite, me permit d'en mesurer les courbures; et je ne pus résister à un sentiment de fierté en pensant que je suivais la pensée du maître dans une partie des ruines qu'il n'avait pu

interroger lui-même. Veuillez excuser ce souvenir : il donne la mesure de mon admiration ; c'est celle de tous nos collègues français et, j'en suis sûr, celle des collègues de toutes les nations. Daigne notre vénéré maître en agréer le respectueux hommage.

Mr. Aston Webb's Fourth "At Home."

The President's "At Home" at the Institute on Saturday, the 18th, was the fourth of these functions given by Mr. Aston Webb since his election to the chair two years ago. They were inaugurated during his first session to enable members to meet together under conditions more favourable to friendly intercourse than the ordinary meetings admit of. They have from the first been the most popular events of the session, and have been very largely attended, not only by London members, but by members from the provinces far and near.

Particularly appreciated have been the exhibitions of drawings lent for these occasions. They have usually remained on view for a day or two afterwards, and have attracted a large number of visitors. In this way have been seen our modern masters, J. F. Bentley (at the first "At Home"), W. Eden Nesfield (at the second), J. L. Pearson (at the third). The exhibition at last week's function consisted of a numerous collection of architects' holiday sketches, of which Mr. Walter Millard kindly contributes a notice in these pages under the heading "Architects out of Office Hours." At this exhibition the following were represented :—

Aston Webb, R.A.	J. J. Joass
Maurice B. Adams	R. Knott
S. D. Adshhead	H. V. Lanchester
Professor Aitchison, R.A.	H. W. Lonsdale
Frank Baggallay	Mervyn Macartney
R. S. Balfour	C. E. Mallows
C. E. Bateman	E. J. May
Francis W. Bedford	Walter Millard
John Belcher, A.R.A.	Arnold Mitchell
A. W. Bentham	W. Hilton Nash
W. H. Bidlake	Ernest Newton
A. C. Blomfield	D. B. Niven
Reginald Blomfield	Professor Beresford Pite
R. A. Briggs	A. N. Prentice
W. D. Caroe	G. H. Fellowes Prynn
H. W. Cotman	Herbert Raine
T. Raffles Davison	R. W. Schultz
E. Guy Dawber	John W. Simpson
H. P. Burke Downing	C. Wontner Smith
Sir Wm. Emerson	R. Phené Spiers
Owen Fleming	H. H. Statham
Wm. Flockhart	Leonard Stokes
J. B. Fulton	A. E. Street
Theodore Fyfe	Henry Tanner, jun.
Ernest George	W. H. Thorp
Alex. Graham, F.S.A.	C. Harrison Townsend
S. K. Grenslade	Paul Waterhouse
Arthur Harrison	Maurice E. Webb
W. Hawke	R. Douglas Wells
François Hooper	A. Needham Wilson
Gerald Horsley	B. Selden Wornum
J. Jerdan	

Mr. Aston Webb's Retirement from the Chair.

With the close of the business on the agenda of the Meeting last Monday, Mr. Aston Webb's term as President came to an end.

Pugin Student of the year 1873, he became Associate in 1874, Fellow in 1883, and was first elected to the Council in 1885. He was for some years a member of the Board of Examiners for Architecture, and has served on most of the Institute Committees. In 1889 he succeeded Mr. Macvicar Anderson as Hon. Secretary, and held the office till 1893. He was Vice-President from 1893 to 1897. For many years prior to his election as President he held the responsible position of Chairman of the Committee of Finance. Considering his responsibilities as an architect it is matter for marvel that they could be borne by the same man who, especially during the past two years, was expending so much time, thought, and labour on the Institute affairs. As regards Mr. Webb's generous reference to the staff in his farewell remarks reported below, they will always regard it as a high privilege to have worked under his kindly leadership in the affairs of the Institute.

The following is a note of the remarks on the vote of thanks, the proposition and the President's rising to respond giving opportunity for a display of feeling rarely witnessed at the Institute gatherings.

Mr. JOHN SLATER [F.]: Before we leave this evening, I am quite sure it will be the wish of every member of the Institute that we should pass unanimously a very hearty vote of thanks to our President on the occasion of his retiring from the Chair. [Applause.] We have had during the existence of the Institute many eminent Presidents, but we have rarely had a President who combined in himself eminence as an architect with excellence as a President to compare with Mr. Aston Webb. [Applause.] Every member of the Institute would part with him as President with the greatest regret, and it is a source of great grief to most of us to know that when a President retires from the Chair he can no longer serve on our Councils or give us the benefit of his advice except extraneously. But we can certainly wish Mr. Aston Webb many years of life and prosperity, and we may be confident that on the peaceful fields of Art he will go on from victory to victory, for what he has done as an architect is only an earnest of what we may expect from him in the future. [Hear, hear.] I beg, therefore, to propose a very hearty vote of thanks to our President for his conduct in the Chair during his two years of office. [Loud applause.]

Mr. H. H. STATHAM [F.]: I have been asked to second this resolution. It is apparently one which does not require any seconding, but it is a very great pleasure to me to have the opportunity of adding my voice to what Mr. Slater has said as to the regard and respect which we feel for our

President, Mr. Aston Webb, who combines so admirably practical knowledge with artistic feeling, and who, as President, combined business capacity with courtesy and kindness to all. [*Hear, hear.*]

Mr. BUTLER WILSON [*F.*]: I have not been asked to support the proposition, but I feel a certain responsibility resting upon me, inasmuch as I have, for three years past, represented the Leeds and Yorkshire Society upon the Council of this Institute. On behalf of that Society—and I think I may safely speak for every Allied Society in the country—I should like to say how much we have appreciated the great service Mr. Aston Webb has rendered the profession. Furthermore we remember that he has instituted those delightful "At Homes," which have given opportunity to provincial members, not only to meet each other, but to meet the members here in London. The President has also suggested the desirability of the JOURNAL being opened more widely to reports of our meetings. Perhaps it may be with those of us who practise many hundreds of miles from here that we realise more fully than our metropolitan brethren the liberal-minded manner in which our President has exercised the functions of his high office. [*Hear, hear.*] But, however that may be, we all know that in Mr. Aston Webb we have had a President who had already greatly benefited the profession during his long connection with the Architectural Association. I had the honour to meet him at the Association as long ago as 1881, and I have since that time followed his career with the greatest interest. Moreover, we feel that in him we have had a President who has never feared to express his own individual opinion upon matters of importance. Therefore I have risen without hesitation to support this vote of thanks to him for the services he has rendered this Institute. [*Applause.*]

THE PRESIDENT: Ladies and Gentlemen,—I assure you I thank you very much. You have more than repaid me by the delightful time I have had with you for the last two years. It is twenty years since I first took office in the Institute, and I am afraid I have filled almost every possible office since, not, I am afraid, always to the satisfaction of the Institute—[*No, no*—]but, at any rate, with the greatest pleasure to myself. When I had the honour to be elected to this Chair I think I made two promises. One was that I should make mistakes. That promise I have amply fulfilled. [*No, no.*] The other was that when I did make mistakes they would be through want of judgment, and from a desire, as far as possible, to serve what I believed to be the interests of the Institute. To the best of my belief I have carried out that promise. [*Hear, hear.*] I am greatly indebted to all the members of the Institute. I am immensely indebted to my dear friend, Mr. Alexander Graham, the Honorary Secretary—[*applause*—]who has given me the most loyal support all through

the time. I am greatly indebted to Mr. Locke, our Secretary, and to every member of the staff of the Institute. I am quite certain that no institution of this sort has ever been or could be better served than this Institute is by the officials connected with it. [*Hear, hear.*] They do not seem to mind what trouble they take. I have been a most troublesome and exacting President time after time, but I have never seen them even look annoyed or cross when I have asked them to do anything. They have always done what they were asked and taken it as a matter of course, and my thanks are greatly due to them. I am also indebted to all the members of our Council. They have, every one of them, extended to me the utmost courtesy and personal kindness. We have not always agreed—it would be a very dull affair if we did. [*Hear, hear.*] I thank Mr. Butler Wilson for his remarks; I have not always agreed with him in matters with which we have had to do, but I have always experienced from him personal kindness and courtesy. Before I sit down I should like to say that I feel quite sure that the new Council will extend the same kindness to my successor, who, I am proud to think, will be Mr. Belcher. [*Applause.*] I cannot conceal from myself that the Institute is entering upon a somewhat difficult time, in which great care and consideration will have to be exercised by those who have the direction of its affairs. [*Hear, hear.*] We should all regret if anything was done to disturb the even progress and advancement the Institute has made. [*Hear, hear.*] I venture to think that the Institute has never stood better in public opinion, in artistic opinion, than it does at the present time. [*Hear, hear.*] I have every hope and belief that this estimation will be still further extended and increased. But it can only be, if I may say so, by moderation. As you all know, we were, towards the end of my time, engaged in the consideration of a very important matter. That has now passed out of our hands into the hands of a new Council. We regret—I regret—the loss of many almost invaluable members of that Council. We look, however, to the new ones to carry forward the work of the Institute in a way which shall keep us, if possible, united. Without that unity it is impossible for the Institute to do the work it should do, and it is, I am convinced, as a very old Institute man, essential for architects that the Institute should be strong and respected both by members of its own body and also by those outside, not only by architects but by the whole of the official and artistic world with whom we are brought into contact. [*Hear, hear.*] This, after all, is only a comparatively small matter of politics. What we are most concerned in is our love of architecture and art. That is what we should strive for both in our work here and in our own personal work: to do some little towards the advancement of our art. I thank you all most

warmly for the way you have received me, for the way you have treated me, and for the way you have said good-bye to me. [*Loud applause.*]

Colls v. Home and Colonial Stores.

The following letters have passed between the Institute and Mr. Howard Colls:—

21st June.

DEAR SIR,—I am desired by the Council of the Royal Institute of British Architects to express to you their cordial recognition of the great services you have rendered to the architectural profession by carrying to a successful issue the case of *Colls v. The Home and Colonial Stores*. I am to say that by your public-spirited action you have caused the law of ancient lights to be put on a far more satisfactory footing, and have removed many disabilities under which architects have suffered in dealing with such matters.

I have the honour to convey to you the most sincere thanks of the Council of the Institute.—I am, dear sir, yours faithfully,

Howard Colls, Esq. W. J. LOCKE, Secretary.

5, Coleman Street, E.C.: 22nd June, 1904.

DEAR SIR,—I desire to acknowledge your letter of yesterday's date, and very keenly appreciate the kind expressions on behalf of the Council of the Royal Institute of British Architects as to my endeavours to put the law of ancient lights upon a more reasonable footing.

I feel that, after the decision against me of the Court of Appeal, I could not, in the general interest, leave the matter where it stood.

It is a rare thing to have the opportunity of trying to do some public service, and I am only too glad that the long battle which I fought was won, and I am most grateful to your Council for their very kind recognition of my efforts.—I remain, dear sir, yours faithfully,

W. J. Locke, Esq. J. HOWARD COLLS.

The Birthday Honours.

Mr. Henry Tanner, C.B. [F.], Principal Architect and Surveyor at the Office of H.M. Works and Public Buildings, receives a knighthood. Sir Henry will receive the warm congratulations of the profession.

Obituary.

James William Brooker, of "Durlstone," Brockley Park, and 18 Railway Approach, London Bridge, elected *Associate* 1887, *Fellow* 1892, died on 6th June, aged fifty-one years. He had a considerable practice in the City and southern suburbs, his buildings consisting principally of business premises in the City, hotels, and public-houses, and a large number of private houses in the suburbs.

L. C. Pedro D'Avila, of Lisbon, Hon. Architect to the King of Portugal, architect to the Government, Member of the Royal Academy of Fine Arts, Lisbon, was elected Hon. Corresponding Member of the Institute in 1900.

THE SECRETARY, Mr. W. J. LOCKE, rising after the announcement of Senhor D'Avila's death at the Meeting last Monday, said that as perhaps he was the only one present who had had the privilege of knowing personally Senhor Pedro D'Avila, he might be allowed to say a word in his memory. Senhor Pedro D'Avila he had found to be a most kind-hearted man, and always willing to put his services at the disposal of the Institute whenever occasion arose. He had always been ready to do everything in his power for the advancement of architecture in Europe. He had attended every International Architectural Congress, and it was at the last two International Congresses that he (Mr. Locke) had had the privilege of meeting him. The Honorary Corresponding Membership of the Institute was, he happened to know, regarded by Senhor D'Avila as one of the crowning honours of his life. He met him only a short time ago, in the month of April, in Madrid, and the kindness with which Senhor D'Avila received him, and the manner in which he spoke of his English *confères*, would always remain a pleasant memory with him. His death was a great loss to international architecture and to the Institute.

The Whitgift Hospital.

Messrs. John Belcher, A.R.A., and J. S. Gibson represented the Council on the deputation which waited recently on the Croydon County Council to protest against the proposed demolition of Archbishop Whitgift's Hospital of the Holy Trinity. Viscount Midleton, Lord Lieutenant of Surrey, who was spokesman for the deputation, said that the building was founded over three hundred years ago by the then Archbishop of Canterbury, and had ever since been a source of benefit to the poor people of the district. The buildings were a treasury of art; hall, chapel, and dormitories possessed a character of their own which, once destroyed, could never be replaced. With the exception of the old church and the remains of the Archbishop's Palace, Croydon has now very little to remind it of the past. To demolish this ancient hospital will be to destroy the last link which binds the town to the times of the sixteenth century. The excuse for the destruction of the building appears to be that more accommodation is wanted for the local tramways; but it is asserted that tramway requirements can be amply met in some other way. The Streets Improvement Committee of the Croydon Council have had the protest referred to them, and it is hoped that an alternative plan will be eventually adopted.



PLASTER DECORATION - SANTA MARIA DELLE GRAZIE, MILAN.

PLASTER DECORATION.

In the course of my Paper on "Plaster Decoration," of 14th March last, I mentioned * a beautiful example in the church of Sta. Maria delle Grazie at Milan, of which, however, I was unable to show any illustration. Passing through Milan a few weeks ago, I again visited the church, and succeeded in taking a photograph of a portion of this work, which appears to me of sufficient interest to put before members [p. 460]. The grace of the design and the freedom of execution seem to me to render it particularly worthy of study as an example of artistic and technical treatment exactly adapted to the material in which it is worked. I regret that I have been unable to ascertain to what artist it is attributable.

J. D. CRACE.

ARCHITECTS OUT OF OFFICE HOURS.

CONSPICUOUS amongst the many happy ideas conceived and carried out at the Institute by Mr. Aston Webb during his two years of office as President have been the series of "At Homes" in the Institute Rooms, to which he has invited members and friends; and not by any means the least happily conceived or the least successfully carried out of these functions was the one held on Saturday, the 18th—Waterloo Day—when we were treated to quite a notable display, on the walls, of architects' holiday sketches, the getting together and dispersal of which must surely have entailed no slight amount of trouble and anxious care.

All will agree that in these gatherings we have enjoyed opportunities of learning to know each other better; this particular occasion may be said, indeed, to have afforded exceptional opportunity in that direction, for here were ever so many members revealing themselves to us by their works in almost a new light, showing a side of their nature perhaps little suspected by the majority of their fellows. What a sober, practising architect is capable of when he allows himself to unbend awhile from strictly professional duties may be known to very few, unless he gets drawn out by some such call as this of our President's, to show us his holiday work.

Not since Mr. Maurice B. Adams, nearly twenty years ago, read his Paper on "Architectural Drawing" has such a representative exhibition of architects' sketches been seen at the Institute.

To begin with, our veteran student, Professor Aitchison, shows a whole series of solemn interiors, in which applied colour, learnedly rendered, plays a leading part. Then Mr. Ernest George, *facile*

princeps among living architects in wielding the colour-brush, captivates us by his masterly handling of water-colour, the result of long and steadily maintained practice as an outdoor sketcher. The play of light on a glacier in Switzerland or on terrace walling at Nismes is an inspiration to him to produce a picture; whilst an arched gateway at Tangier affords him a subject for a drawing executed with painter-like feeling and method blended with the special, first-hand knowledge and insight of the architect. The way in which, with loaded brush of clean, strong colour, he lays this latter, in a broad flood of broken tint, letting it take its bearings not just how or where it will, but rather just how and where the artist wills, is something to make a sketcher rejoice to set eyes on.

Mr. John W. Simpson displays his versatility with both brush and pencil in a little group of sketches true in tone and delicate in touch. As to his, so to Mr. Guy Dawber's charming exhibits might well be applied the description, tender and true.

Mr. Flockhart, Mr. Hooper, and Mr. Lanchester all produce work clean, clear, and decided in touch; and Mr. Bedford gives us pure colour cleverly applied. Bright, sunlit subjects in Cyprus and North Africa have appealed, not in vain, to Mr. Alex. Graham.

Mr. Greenslade, Mr. Fulton, Mr. Horsley, and Mr. Schultz, each in his own very definite way, show to what good purpose the pencil may be put in the rendering of architectural detail. Mr. Reginald Blomfield, too, in the rôle of the man behind the pencil, displays a power to conjure with. Quite beautiful is his "Pershore Lock," most painter-like in its velvety "greys" and in the exactly right planting of the "blacks."

Mr. Mallows wields pen and pencil apparently with equal facility and certainly with equal felicity—as might be said also of Mr. Raffles Davison.

Mr. H. W. Cotman, the bearer of an honoured name in the history of English water-colour painting, shows work calculated to maintain the honour of that name. Mr. Aston Webb is here at home with his subjects, and, as on all occasions, apparently at ease, whatever his subject or his medium may be—pencil or colour. His son, Mr. M. E. Webb, uses the brush evidently with an eye for light and colour.

Colour sketches by Mr. Adshead show dainty and refined handling, work deftly touched and gently left at just the right stage.

Among the representations of street scenes at home and abroad, Mr. Jerdan's and Mr. Raine's clear and clean-cut drawings contrast effectively with Mr. Bentham's and Mr. Harrison's quiet and accomplished brush-work.

Mr. Lonsdale, Mr. Wornum, and Mr. Phené Spiers contribute sound, straightforward sketches in colour, models on which any beginner might safely found himself in trying to develop a method

* JOURNAL, 19th March 1904, p. 261.

of his own. Amongst the pencil-men must be mentioned Mr. Prentice and Mr. Wontner Smith for brilliancy, and Mr. Bidlake, Mr. Paul Waterhouse, Mr. Fyfe, and Mr. Belcher for clean, condensed sketching, in which the lead is, as it were, economised to the last grain. In Professor Pite's street scene, at Tewkesbury, pen and brushwork happily combine to produce a picture, but a picture that only an architect could well produce. Mr. Arnold Mitchell and Mr. Caroe afford us pleasant peeps into their sketch-books, whilst the latter also gives us nice colour in a coast scene.

But to attempt any further description of exhibitors' work is now impossible. Only some even of the names of those as yet unmentioned can be given, whose works possess no less claim to due notice than the rest. Sir Wm. Emerson, Mr. Mervyn Macartney, Mr. Ernest Newton, Mr. May, and Mr. Stokes all send work that could not be overlooked; as may be said also of Mr. R. S. Balfour, Mr. A. C. Blomfield, Mr. Baggallay, Mr. Fellowes Prynne, Mr. Harrison Townsend, Mr. Joass, Mr. Morley, Mr. Maurice Adams, Mr. Arthur Street, and Mr. Statham.

It is refreshing, and is surely a subject for some excusable pride to an architect, to be so happily reminded that there are yet men in our own profession helping to carry on worthily the traditions of the English School of Water-Colour Painting, handed down to us unbroken—the school of Girtin and Turner; of J. Sell Cotman, Bonington, and De Wint; of Prout and of David Roberts—to mention only some of those Old Masters of the school who not unfrequently loved to choose buildings for their subjects.

WALTER MILLARD.

DISCUSSION ON PLENUM VENTILATION AND THE ROYAL VICTORIA HOSPITAL, BELFAST.*

JOINT REPLY BY WM. HENMAN AND THOS. COOPER, ARCHITECTS,
AND HENRY LEE AND SON, CONSULTING ENGINEERS.

In consequence of the late hour at which this discussion was taken on the 6th instant, it was impossible for us then to reply; but with the sanction and approval of the President, we now do so as briefly as the importance of the subject will allow.

We welcome such minute inspection as that made by Mr. Pick, because, when undertaken with an open mind, it is likely to extend appreciation of the possibilities of plenum ventilation for hospital purposes.

We put forward no claim to having arrived at perfection in plan, and are not surprised that so

novel an arrangement of wards calls forth criticism, notwithstanding that those who have had to serve in or occupy the hospital are perfectly content with its facilities for administration, and its comfort and cheerfulness.

The exceptional conditions demanded special treatment as regards drainage. All drains are kept well below the floor level of the air ducts, which are by no means the dark, damp places some seem to suppose. The City Building Surveyor of Belfast took a broad view of the subject and advised we should have a free hand with the drainage.

The object aimed at was to convey from the buildings, as quickly as possible, all foul matter and waste waters, and so prevent the generating of offensive gases on the site.

The multiplication of traps, manholes, and gullies was advisedly avoided; the drains run in long straight lines; they are thoroughly ventilated, and there is ample flush for cleansing them. Soil drains are distinct from wastes.

On inquiry, we find that a few of the calked lead joints to vertical waste pipes have slightly given, and we are obliged to Mr. Pick for detecting that fault, because means will now be taken to obviate it in future; but we venture to say that no harm would in this case result, as the pipes are of thick metal, in short lengths, easily got at, and quite away from any opening into the hospital; such pipes are safer and can be more readily inspected and joints made good, if necessary, than those usually provided for hospitals, viz. in long lengths of thin metal, with many inaccessible joints, and others in quite close proximity to windows.

Mr. Pick's sentimental objection to washing-up sinks in sanitary turrets is not only applicable to this hospital; the arrangement, however, is found to be convenient in practice and is not complained of by the nursing staff.

If there were difficulty in keeping milk fresh, as things are in the hospital, his criticism would be reasonable; but this, together with his wish for open windows, evidently proves that Mr. Pick has not yet fully grasped the possibilities and requirements of plenum ventilation.

Successful application of the system implies that continuously, year in and year out, sufficient change of air shall be secured throughout the building. Where, then, is the necessity for open windows by which air can only be admitted proportionately to the force of wind outside or to difference of temperature within and without?

Mr. Pick was hypercritical in his remarks on the details of engineering. Although there are no outer doors to the stoke hole, he may not have noticed that only the fronts of the boilers are exposed, the wall above being entirely built up, access to the space above the boilers being from the pump-house—a much more cleanly arrangement than having the tops of the boilers open to the stoke hole.

* JOURNAL, 11th June 1904.

At this time of year, when no heating of the building is required, the feed-water for the boilers would be nearly cold, because little or no condense water is going back to the hot-well, and all the exhaust steam from the engines is usefully engaged in providing the hot-water supply throughout the hospital. There must be a receptacle of some kind for the condense water flowing back from the various steam traps. Whether or not this receptacle takes the exact form of the hot well that we have provided seems to us to be immaterial.

With regard to the exhaust steam from the engines going to waste, this is not the case. The exhaust from the fan engine is used for the hot-water supply to the hospital, and the exhaust from the laundry engine is used for heating the water for the laundry, and the surplus from the calorifier goes to heat the coils in the drying-room.

Mr. Pick thinks that there are too many steam traps, but if he were to go carefully into the matter, he would find that the number could not with advantage be reduced.

The question of generating electricity on the site was duly considered and abandoned in consequence of the greater cost and less efficiency than the arrangement adopted.

Mr. Saxon Snell's remarks can scarcely be taken seriously, and were evidently justly appraised by subsequent speakers. In contrast therewith, we commend the more thoughtful views expressed by Dr. S. Rideal and the Rev. J. B. Lock, because, with greater practical experience, their opinions may become more definite and serviceable.

Mr. Harold Griffiths questioned the employment of fixed screens of cocoa-nut fibre, but the experience of ten years confirms us in their use. If of ample area, periodically cleansed and renewed, they are suitable and efficient, and far more simple and serviceable than when made to revolve, because then they either become over-saturated with water or imperfectly cleansed.

When made in sections, as at Belfast, cleansing and renewal are easily effected at much less cost than can be done with revolving screens, to say nothing of the additional cost incurred by causing them to continuously revolve.

Heating coils should certainly be kept clean; we always arrange so that they can be and are regularly cleansed as well as the air ducts.

When open fires are employed chimneys have to be swept, grates cleaned, and works of repair and renewal from time to time effected, which probably involve greater labour and expense than are required for cleansing and maintaining suitable appliances for securing plenum ventilation with heating.

Mr. Max Clarke errs in advocating air channels of metal or lined with glass or vitreous enamel; such materials are costly, and in many respects unsuitable. Good plain brickwork, in ducts of ample proportion, is economical and thoroughly serviceable.

The extraction of a portion of the air of a building by means of the furnace flue to the heating apparatus, as referred to by Mr. Munby, has often been attempted. Actual practice confirms the result of his calculation, which shows how little change of air within a building can thereby be effected. The fact should also be taken into account that probably for six months in the year there will be no fire in the furnace, just when change of air within the building is most required.

If those who question whether advocates of plenum ventilation pin their faith on the admission of air to the upper portion of an apartment and its exit near the floor level carefully read Mr. Henman's paper, they will scarcely fail to understand why that arrangement accords with nature's method, and is therefore preferably followed.

It is difficult to understand why the speakers who advocated plenum ventilation for assembly rooms, schools, and even for operating rooms, question its utility in hospital wards; because, even in hospitals erected on the most approved pavilion plan, complaints of defective ventilation are common, particularly at night and in the early morning. Unfortunately, hospitals are rarely visited by architects or the public at such times. But go to the General Hospital, Birmingham, or the Royal Victoria Hospital, Belfast, at any hour of night or day throughout the year, and it will be found that uniform temperature and freshness are maintained, to say nothing of freedom from draughts and of the noise, dirt, irregular heating and attention required when open fire-places are employed.

Expense, as the President intimated, is certainly an important item in connection with any system of ventilation and heating. Our endeavour has been so to simplify hospital planning, and adapt appliances for heating and ventilation, that at Belfast the initial outlay and cost for maintenance are very considerably below those of any other similarly complete hospital.

The deductions of Mr. Geo. H. Bibby are so obviously unreliable that it is not necessary to take up space to do more than state that we communicated them to the Superintendent of the hospital, and here give his reply, viz.:—

"The general health of the hospital establishment is excellent (*twice underlined*). I cannot trace the doctor who is alleged to have said the hospital always gives him headache. I have twelve doctors and medical pupils in residence, and all, except one, are in excellent health, and the hospital had nothing to do with that one man's state of health.

"The nurses, too, are in far better health than they were before we came here. I have that from the doctor who attends them.

"Why don't you propose to the R.I.B.A. to send a small deputation here to inquire into the whole question on the spot? What all should desire to

know is the truth—whether plenum ventilation is a success, and worthy of adoption, or not. In no other institution can that be better ascertained than here, where a very fair idea can also be obtained of the cost, which is a matter of great importance."

He has also given us full particulars *re* the amount of coal consumed, and the number of residents in the old and new hospitals, which entirely disprove Mr. Bibby's statements.

For the year 1902 it was 516 tons for 190 residents in the old building, where the heating and hot water supply were very inadequate, and only the linen from small fever wards was washed on the premises.

In the new buildings the heating, ventilation, and hot-water supply are ample for the full complement of about 400 residents, although at present there are only 300. There is also a complete laundry, in which all the washing is done on the premises; on the basis of eight months' coal consumption, it is estimated that it will not exceed 1,800 tons for the year—by no means a proportionately unreasonable amount for the effective work accomplished in an establishment so much larger than the old one.

We hope that Mr. Bibby may be more accurate in the information he is collecting for publication *re* the heating and ventilation of hospital wards, or it will be of no practical value.

In conclusion, diversity of opinion there is sure to be in respect to a scheme like that of the Belfast Hospital, in consequence of its novelty in plan and equipment; but most of us have probably learnt that things we once thought impossible, or at least unlikely, have actually come to pass, and that appliances and processes have become practically useful and a commercial success, in consequence of slight improvements in parts. If, therefore, plenum ventilation be accepted in principle, its public utility really depends on the careful adjustment of details and of full knowledge of the best methods for securing desired results.

Every installation, no matter how badly proportioned, in which air is forced through a building, is called "Plenum Ventilation," but air at a high temperature forced along small ducts and through buildings by high speed fans cannot, as regards efficiency, be compared with the low temperature, spacious ducts, and slow speed fans adopted at Belfast. Bad examples have brought condemnation upon the plenum system, generally by those who do not discriminate between the various means by which it can be carried out. On what may be termed the "high pressure method," a temperature of 180° F., as the air enters the apartments, is not uncommon; but in Belfast the temperature of the air is never raised to above 63° by the heating appliances except where specially required to be higher, as in the operating rooms. Before designing the machinery for Belfast, inquiry was made as

to the power which would be required for working on the high pressure method, and it was found that 100 horse-power would be necessary; instead of which, it is successfully accomplished with an ascertained expenditure of 5½ horse-power, on what may be termed the "low pressure method."

MINUTES. XVI.

At a Special General Meeting convened in accordance with Clause 83 of the Charter and held Monday, 20th June 1904, at 8.15 p.m.:—Present: Mr. Aston Webb, R.A., F.S.A., *President*, in the chair, 52 Fellows (including 16 members of the Council), 46 Associates (including 3 members of the Council), 3 Hon. Associates, 1 Hon. Corresponding Member, and numerous visitors, the Minutes of the Special General Meeting held 6th June [p. 446] were taken as read and signed as correct.

On the motion of the President the following Resolution passed at the Special General Meeting of the 6th June was confirmed, viz.:—"That the following words be added at the end of the first clause of By-law 3—viz.

"After the 31st December 1906 every person desiring to be admitted a Fellow shall be required to have passed the Examination or Examinations qualifying him as an Associate, or shall be elected from the ranks of the Associates. But in special cases the Council by the votes of three-fourths of such members of the Council as are present and voting at a meeting of the Council shall have power to dispense with such Examination or Examinations."

The Special Meeting then terminated.

At the Sixteenth General Meeting (Ordinary) of the Session 1903-04, held at the conclusion of the Special Meeting above minuted and similarly constituted, the Minutes of the Meeting (Business and Ordinary) held Monday, 6th June [p. 446] were taken as read and signed as correct.

The decease was announced of James William Brooker, *Fellow*; and Pedro D'Avila, *Hon. Corr. Member*, Lisbon.

The following members, attending for the first time since their election, were formally admitted by the President:—Lord Stanley of Alderley, *Hon. Associate*; John Campbell Turner Murray, William Henderson Duncan (Rochdale), Max Clarke, *Fellows*.

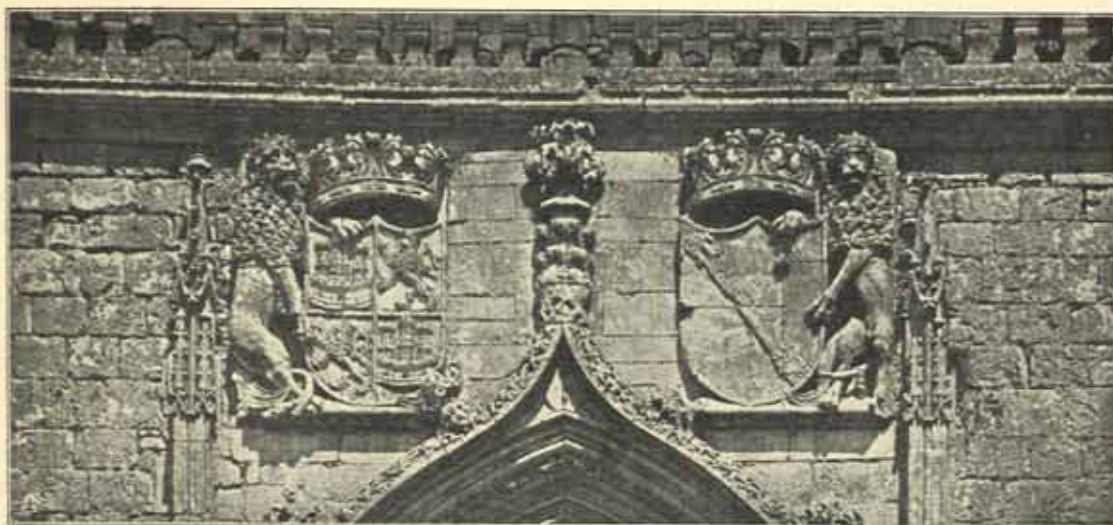
The President delivered an address at the Presentation of the Royal Gold Medal, the gift of His Majesty the King, to M. Auguste Choisy [*Hon. Corr. Mem.*], *Inspecteur-Général honoraire des Ponts et Chaussées*, Paris; and M. Choisy, having been duly invested with the medal, replied in acknowledgment of the honour.

Professor Aitchison, R.A. [*F.*], Sir L. Alma-Tadema, R.A. [*H.F.*], and Mr. B. Phené Spiers, F.S.A. [*A.*], addressed the Meeting in eulogy of M. Choisy's literary work in connection with architecture.

On the motion of Mr. John Slater [*F.*], seconded by Mr. H. H. Statham [*F.*], and supported by Mr. Butler Wilson [*F.*], the thanks of the Institute were voted by acclamation to the outgoing President for his conduct of the affairs of the Institute during his occupancy of the chair.

Mr. Aston Webb having acknowledged the vote and referred to the present position and future policy of the Institute, the proceedings closed, and the Meeting separated at 9.30.

On view in the rooms was the collection of architects' sketches lent for the President's "At Home" on the previous Saturday.



A HOLIDAY IN PORTUGAL.

By W. CRUM WATSON.

Read before the Edinburgh Architectural Association 16th January 1904.

THE Roman dominion of Portugal lasted for some 450 years, but beyond the language it has left little trace, except in some remains of roads and bridges and in the ruins of a temple at Evora. The Visigoths, who came after the Romans, and whose rule lasted till 711, may be said to have left no trace at all. In 711 Roderick, the last king of the Visigoths, was defeated by the Moors at Guadalete, near Cadiz, and what is now Portugal fell at once into the hands of the conquerors. The Moors have left far less evidence of their dominion in Portugal than has been the case in Spain. The reconquest by the Christians began almost at once, and by the end of the tenth century we find the northern third of what is now Portugal forming two counties under the King of Galicia. About a hundred years later Henry of Burgundy coming to the help of Alfonso VI. of Castile and Leon was rewarded with the hand of Alfonso's daughter Urraca and the counties of Coimbra and Oporto. His widow was the first to try to make Portugal independent, and her son Affonso Henriques won that independence and got himself acknowledged as king in 1139. Affonso Henriques extended the permanent borders of Portugal to the Tagus, winning Lisbon, with the help of some English Crusaders, and founding the great Cistercian abbey of Alcobaça in gratitude for the capture of Santarem. By 1223 the whole of what is now Portugal was free of the Moors. At the end of the fourteenth century the last legitimate heir of the house of Burgundy died; and though the King of Castile and Leon had the best legal claim, a half-brother of the last king was elected and crowned as King João I. in 1385. King John defeated the Spaniards and fulfilled a vow made on the battlefield by founding the Dominican convent of Batalha, or Battle. The building was begun in 1387, and the same year King John married Philippa of Lancaster, daughter of John of Gaunt. One of his sons—the Infante Henry—spent his energy and money in trying to find the way to India round Africa. Success came after Prince Henry's death, and the Indian trade and conquests which immediately followed had important results on the work of the early sixteenth century, especially as seen at Thomar

and Batalha. King John's grandson, Affonso V., made some important conquests in Morocco during the last years of the fifteenth century, and to that, rather than to any actual Moorish remains in the country—for there is hardly anything—may be due the use of Moorish arches and ceilings during the first twenty years of the sixteenth century.

This period, from about 1480–1550, was the most prosperous in Portuguese history. King Manoel, who died in 1520, had a monopoly of trade with the East and also a large income from Brazil, and with this enormous wealth, added to Batalha and Thomar, rebuilt many churches in many places, made the Palace of Cintra what it now is, and began the great Jeronymite monastery of Belem. When Manoel's son, the Cardinal King Henry, died in 1580 Portugal was seized by Philip II. of Spain, and sixty years of poverty and decay followed. In 1640 there was a successful rebellion: the Spaniards were driven out, and the alliance with England renewed. Except a few churches in Lisbon, designed by Italians for Philip, hardly anything was built which is worthy of notice, and the churches became mere jumbles of classic detail.

Almost the only thing of interest are the tiles with which almost all these late buildings are lined: sometimes they form large figure-subjects in blue, sometimes patterns—usually in blue and yellow. Modern town houses, if not whitewashed, are almost all covered outside with tiles, and are peculiar among Continental houses in having, as a rule, sash windows, which may be due to the long-continued intercourse with England. In 1755 came the great earthquake which knocked down nearly the whole of Lisbon, and in the beginning of the nineteenth century the French invasion, which did nearly as much harm, stalls and reredoses being used for firewood and the church plate being carried off. Lastly, in 1834, all the religious orders were suppressed and the monasteries turned into barracks, hospitals, or show-places.

Having given this rapid sketch of the history of Portugal, I shall take the buildings in chronological order as far as I have been able to find out their dates.

The first is the Corinthian temple at Evora. Evora, which is now the chief town in the province of Alemtejo, was in Roman times a town of considerable importance. This temple, commonly called the Temple of Diana, stands on a partly artificial platform close to the highest part of the town. Like most Roman temples it stands on a podium, which is about 12 feet high and built of granite. On this podium there still stand fourteen granite shafts 3 ft. 4 in. in diameter, and, not including the cap and base, about 23 ft. 6 in. high.

The caps and bases are of white marble. The most remarkable feature of the building is the number of the flutes on the shafts, there being only, I think, twelve instead of twenty-four. Till 1834 the columns were walled up, there were battlements on the architrave, and the whole was used as a slaughter-house. It is the best preserved temple in the peninsula.

We will now leave Evora for a little and go north to Coimbra, which, as we have seen, became chief town of a Christian county in the eleventh century. I do not know when the old cathedral was built, but it must have been towards the end of the twelfth century and before all danger of Moorish invasion had passed away. The plan [fig. 1] is of the usual Romanesque type: nave and aisles of five bays, transept with lantern over the crossing, and three apses. The barrel vault of the nave is buttressed by the half-barrel vaults of the galleries over the aisles, so that the flat roof is all at the same level and defended all round by a continuous row of battlements.

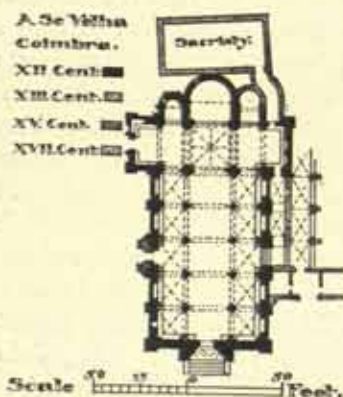


FIG. 1.—OLD CATHEDRAL, COIMBRA.

The west front is interesting and unusual; the large projecting doorway below with its

refined carving has above it a large and deeply recessed window, almost the only one which now lights the nave, and above it a narrow belfry. The north door is a fine example of French Renaissance, and was added by João de Roão, or John of Rouen, in the sixteenth century.

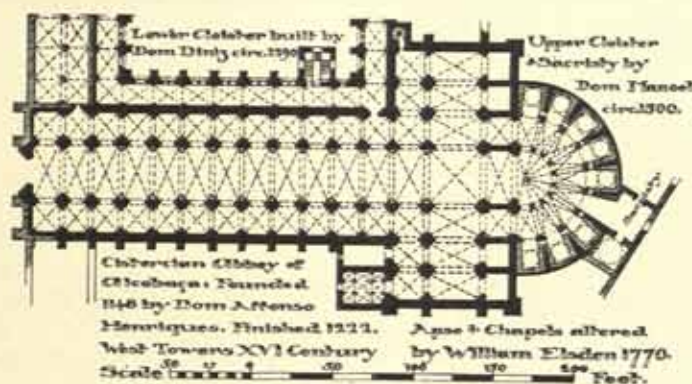


FIG. 2.—ABBAY CHURCH, ALCOBAÇA.

copy of St. Sernin at Toulouse. Till a few years ago there was a fine sixteenth-century wooden choir gallery over the western bays, and the piers inside were all covered with beautiful tiles of a Moorish pattern. These have unfortunately been improved away. The remarkable point is the very curious way in which the stringcourses inside are all stopped against the vaulting shafts. The great carved and gilt reredos is supposed to have been made by a Fleming called Olivet of Ghent in the sixteenth century.

The great Cistercian abbey of Alcobaça was founded by Dom Affonso Henriques in 1148 as a thank-offering for the capture of Santarem, and was endowed with enormous wealth. The plan [fig. 2] is an almost exact copy of that of the churches of the French abbeys of Clairvaux and Pontigny, and was probably brought by the monks when they came from France.

The nave is very long, of thirteen bays, with all three aisles of the same height, and is remarkable for the way all the vaulting shafts of the main vault, except in the two western bays, are corbelled out at varying heights from the ground. It is difficult to say why this was done, unless it is true that there were really 999 monks, for then their stalls might have filled 200 feet of the nave.

The apse was unfortunately ruined in 1770 by an Englishman—William Elsdon—who entirely hid the old work with two stories of classic columns.

Of the monastic buildings, which covered an immense area, all except the main cloister



FIG. 3.—CLOISTER OF DOM DINIZ, ALCOBAÇA.

The cloisters, which were built some time during the thirteenth century, are at a considerably lower level than the church: they have lost whatever tracery the large arches may have held, but of the round opening above a large number are still filled with thin slabs of granite pierced with elaborate patterns.

In 1160 the Templars were established by Dom Affonso Henriques at a place now called Thomar, a few miles from the north bank of the Tagus, then the southern boundary of the Christian kingdom. They first established themselves on low ground by the river Nabão and there built a church, which was the mother-church of all the Templar churches in Portugal, and later of all the churches held by the Knights of the Order of Christ, including the whole of Brazil. The present church of Sta. Maria de Olival must be about a hundred years later than 1160, though the fortified bell-tower opposite the west door may belong to the original foundation. The west front has a good thirteenth-century door with a large early rose window above, now, unfortunately, partly blocked up with plaster and bits of wooden tracery; while the aisle windows show a curious rudimentary kind of tracery, like the windows in the church of Leça de Balio, near Oporto, which is known to have been built in 1336. Inside the church is very plain, and of all the interesting tombs it once contained only one has survived, that of the first Bishop of Funchal in Madeira, who died in 1525, and which must be the work of João de Castilho, who did so much about that time in the great convent on the hill above the town.

Twenty-five miles west of Thomar is the town of Leiria, where King Diniz built himself a great castle in the thirteenth century. The ruins of the castle still stand on a great black rock, higher and steeper than the castle rock in Edinburgh. Part of the way up stands a small deserted church with a good Romanesque doorway, and a little higher are the ruins of the castle church, which had a plain unvaulted nave and a fine vaulted chancel, all very much destroyed. The door on the south side of the nave is very like all the doors of the middle of the fourteenth century.

Of the same date is the church of Leça de Balio, founded as a monastery before the days of the monarchy: it became later the headquarters of the Knights of St. John of Jerusalem, who rebuilt the church in 1336. It is completely fortified, more, I suppose, because it belonged to a commandery of the hospital than for any reason of defence. The round window is very like that still existing in the spoiled cathedral of Oporto and in the Franciscan church there, which was built at the same time, and which, like Leça, looks outside about a hundred years earlier than it really is. The other windows show a not very successful attempt to unite two lancets under one arch.

In 1385 King João defeated the Spaniards at Aljubarrota, not far from Leiria, and in



FIG. 5.—CATHEDRAL, EVORA. LANTERN FROM CLOISTER.

consequence built the Dominican monastery of Batalha, or Battle. All the writers whom I have read on the subject say that the remarkable likeness Batalha bears to York Minster must be due to the King's marriage with Philippa of Lancaster. You will admit on seeing

the church that Batalha and York are as unlike as any two contemporary churches can be. The plan of the church [fig. 6] is just like what we have seen at Evora, except that there is no lantern; in short, there is no feature that can be ascribed to any particular country; so I think we may conclude that the first architect, Affonso Domingues, if he did travel in France and Germany, came back rather confused with what he had seen, and evolved the very curious tracery out of his own head. If there is anything French about the building it may be due to his assistant and successor, Huguet, who,

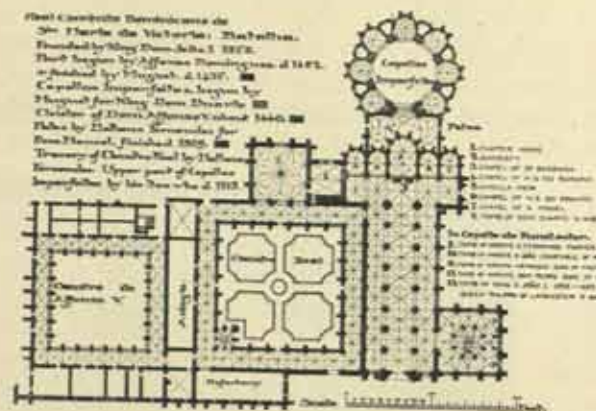


FIG. 6.—ST. MARY OF VICTORY, BATALHA.

from his name, must have been a Frenchman. The west front has a fine door with curiously early-looking figures on the tympanum. Above the panelled tracery, in which a German writer has seen English Perpendicular, comes an extraordinary window, and higher up more panelling, and then an elaborate parapet at the end of the flat roof. To the south is the



FIG. 7.—WEST FRONT, BATALHA.

chapel of the founder, a square lit by curious windows, with an octagon in the middle supporting a lantern, which is said once to have had an open-work spire. The aisle windows of three lights are very tall, and spoilt by the insertion of elaborate wooden tracery to hold pieces of hideous blue, green, and red glass. The south transept has a very curious door which looks as if it belongs to the twelfth century, with a large window above. The chapter-house belongs to the original design, and is a great room, about 60 feet square, with an elaborate stone vault which seems to have hardly sufficient support. The refectory to the west of the main cloister was begun at the same time. It is a very plain room with a barrel vault. The main cloister, also begun by King João, was not finished till about one hundred years later. Inside, the nave is very high and much simpler than one would have expected from the outside. The windows of the chancel still, fortunately,

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retain their old glass, the only glass in the country which has survived the French invasion. Under the octagon of the Founder's Chapel, which has highly stilted and cusped arches, lie King João and Queen Philippa on a high plain tomb, while along the south wall are buried four of their sons, including Prince Henry the Navigator. Duarte, or Edward, King João's successor, began to build himself a much finer chapel to the east of the church, a great octagon, over 70 feet across, with seven apsidal chapels opening off it. He died after a short reign of five years before the seven chapels had been vaulted, and his son, Affonso V., was too much taken up with wars in Africa to carry on the work. How this chapel was intended to be joined on to the church there is nothing to show, for the space between it and the church was built over by King Manoel in the first years of the sixteenth century. Of the original building there remain the seven large chapels with the cusped arches opening into them and the six small ones between, and so it remained till the reign of King Manoel, who employed Matheus Fernandes to finish it. He began by building the entrance hall across the east end of the church, with its two remarkable windows and the wonderful doorway into the chapel. This was all finished by 1509. This great doorway is the most elaborate example of the style which became universal during King Manoel's reign. Up to the springing of the arch the door might pass for a fine piece of French work of the fifteenth century, but above the whole becomes an elaborate mass of hanging and intertwining moulding, which, though it is clearly related to such a doorway as that of the



FIG. 9.—CAPELLAS IMPARFEITAS, BATALHA.

chapel of the University of Coimbra and to Spanish work as seen in some windows at Salamanca, has yet a distinctly Indian effect. Higher up the younger Matheus Fernandes began to build eight most curiously banded and shafted piers, which, as a German writer points out, are not unlike the great minaret at Delhi called the Kutub: between these were to be eight large windows. But it is inside that the most remarkable ornamentation is to be seen. Above King Duarte's seven arches and the great doorway runs an elaborate architrave frieze and cornice with a very Indian cresting of budlike forms tied together in twos, while between the windows are most curious niches and bands of carving.

Unfortunately King Manoel changed his mind and preferred to be buried in his new monastery of Belem, so that the chapel was left unfinished; and though his son, John III., brought João de Castilho from Thomar, he did little, and that in quite a different style. The chapel has remained unfinished to this day, and we are left to wonder what sort of roof it was to have. Probably some kind of dome with the eight piers carried up into spires.

While Matheus Fernandes was working at the Capellas Imparfeitas he and his son also

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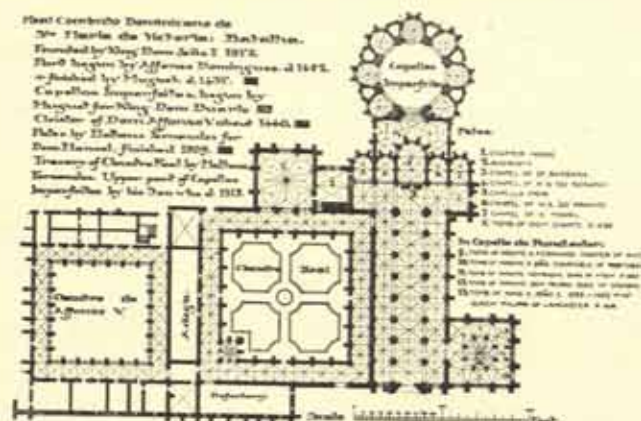


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FIG. 8.—CAPELLAS IMPARFEITAS, BATALHA.

Unfortunately King Manoel changed his mind and preferred to be buried in his new monastery of Belem, so that the chapel was left unfinished; and though his son, John III., brought João de Castilho from Thomar, he did little, and that in quite a different style. The chapel has remained unfinished to this day, and we are left to wonder what sort of roof it was to have. Probably some kind of dome with the eight piers carried up into spires.

While Matheus Fernandes was working at the Capellas Imperfeitas he and his son also

though the form and construction are more like the twelfth century. King Manoel was Grand Master before he became King, and finding the church too small he in 1493 employed João de Castilho to build a nave on to the west side of the Templars' church. This is of three bays, with a raised choir occupying the two western bays and a chapter-house under the choir. The entrance is on the south side of the eastern bay, and like the great south door at Belem, built a few years later by João, shows, with a generally Gothic design, a mixture of classic detail. It seems that João de Castilho planned the whole nave, but going to Lisbon to carry out the monastery of Belem left the execution of the carving to Ayres do Quintal, who worked out the details in a most extraordinary manner, covering the western bay and the west front with very strange naturalistic forms. The interior of the Templar church had been decorated already with late Gothic ornament in gilded stucco and with Flemish-looking paintings by Olivet of Ghent, who also carved the fine choir stalls burned by the French for firewood in 1810. It is on the round turrets and the chapter-house window that the most curious efforts of Ayres do Quintal are seen. While the other buttresses end in late Gothic pinnacles, these turrets are finished in a way quite unlike anything else: below these tops are bands like knotted tree-trunks, and below again a great belt and buckle, apparently holding a sort of tasseled fringe. The west window of the chapter-house is indescribable from the cross of the Order of Christ at the top to the figure said to be a portrait of Ayres at the bottom: it is a mass of twisted and knotted carving, while inside the jambs are even more extraordinary. By 1509 the Portuguese had already made great conquests in India, and it seems reasonable to believe that these extraordinary forms were borrowed from India; and as, if they were really not carved till after João de Castilho went to Belem in 1522, Ayres cannot have carried them out till after that date, that gives plenty of time for Indian ideas to have been imported.

In 1523 the Order of Christ was made a monastic instead of a military order, and this entailed great additional building which João de Castilho came back to carry out. Meanwhile he must have quite changed his style, for his new work here is even more free of Gothic feeling than is Belem. He built the two great galleries with cells opening off them, and four of the eight existing cloisters, all in a kind of French Renaissance. The galleries are covered with wooden barrel-roofs, and where they cross is a very elegant little chapel. He also began the cloister to the south of the church in 1540, but left it quite unfinished when he retired ten years later, fifty-seven years after he had begun the nave of the church. Next year, in 1551, it was begun again by Diogo de Torralva in fully developed classic, and finished in 1580 after the accession of Philip of Spain. Except the great chapter-house begun by Dom

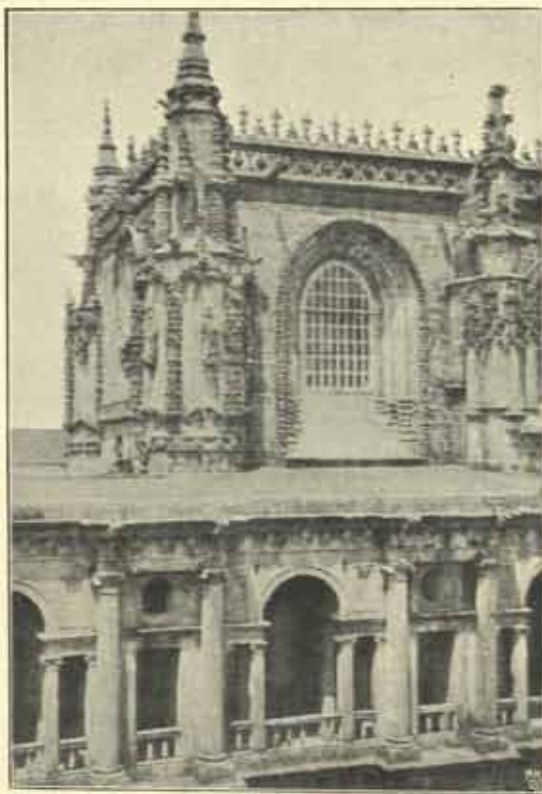


FIG. 11.—NAVE OF CHURCH, CONVENT, THOMAR, WITH UPPER CLOISTER OF PHILIP.

Manoel and never finished, most of the rest of the great mass of building is eighteenth century and poor.

The monastery of Sta. Cruz at Coimbra was founded by the first Portuguese king in the twelfth century, but entirely rebuilt by King Manoel. The church consists of a broad nave flanked by chapels, a chancel, and a large monks' gallery at the west end. The west front is peculiar. A very large door below, somewhat blocked up in the eighteenth century, is surrounded by partly Gothic and partly classic pinnacles and niches, and has above it a large round-headed window, which lights the choir gallery. The top is flat and is flanked by octagonal turrets which grow out of square bases.

Inside, besides two very fine tombs to the first two kings, is a pulpit carved by John of Rouen, with the four doctors of the Latin Church sitting in niches, and between them, above the cardinal virtues, and below the prophets of the Old Testament. In the high choir are

some very fine stalls carved and gilt, probably by Olivel of Ghent. Each seat has Dom Manoel's sphere at the back.

The chapel of the University of Coimbra was originally the palace chapel, and must have been built about the same time. Its doors and windows are very characteristic of the less elaborate work of the latest Gothic period, and show by the interlacing of their mouldings where Matheus Fernandes got the idea for the great arch to the Capellas Imperfeitas at Batalha.

The church of St. Francis at Evora is another work of Dom Manoel's, but quite unlike the rest. Built like the cathedral of granite, it is very plain and severe. The west front has a large porch in front opening to the street by five horseshoe arches, with behind a characteristic doorway adorned with Manoel's sphere; and above a large segmental headed window with a kind of Perpendicular tracery. Inside



FIG. 12.—MONASTERY OF BELEM, NEAR LISBON.

the church has a wide nave with tile-lined chapels and a sort of Welsh groined vault. To counteract the thrust of this vault, the outer walls of the chapels are carried up to the same height as the inner, the space between being vaulted in some way, so that the nave has practically no windows, except the large one over the porch and a small one over the chancel arch and two over the transept chapels.

We now come to the monastery of Belem, founded in April, 1500, by Dom Manoel in honour of Vasco da Gama's discoveries. The first architect was Boutaca, who laid the general plan of the building, but very little was done till after Manoel's death, when, in 1522, João de Castilho was summoned from Thomar.

The church consists of a nave, about 77 feet wide by 165 feet long, of three aisles, all over 80 feet high; a transept without aisles and measuring 95 feet by 65 feet; two transept chapels and a later chancel. To the north lies a two-storied cloister with refectory, chapel-house, and sacristy, and to the west the undercroft of the dormitory, 607 feet long.

The chief entrance is to the middle of the south side, and is something like the door at Thomar, but much larger and more elaborate. In each bay to the right and left is a large

round-headed window with elaborate mouldings, while round the whole church runs a band of carving. Next the big window to the west comes a bay with two windows—one above the other, to light the choir gallery and the chapel below—and then one of the intended western towers, now finished with a dome built about thirty years ago, instead of the original low spire. The west door, which is very curious, was intended to be below a large vaulted porch, which was either never built or has fallen.

The whole nave has an elaborate parapet, which is not carried round the transepts. Inside a choir gallery fills in the space between the towers and the first bay beyond, and has in it some good early Renaissance stalls. The four columns of the nave are only about 4 feet thick and must be about 60 feet high, with an elaborate stone vault to carry. Those between the nave and transept are about twice as thick, like the others carved to the



FIG. 13.—ABBAY CHURCH, BELEM FROM EAST.

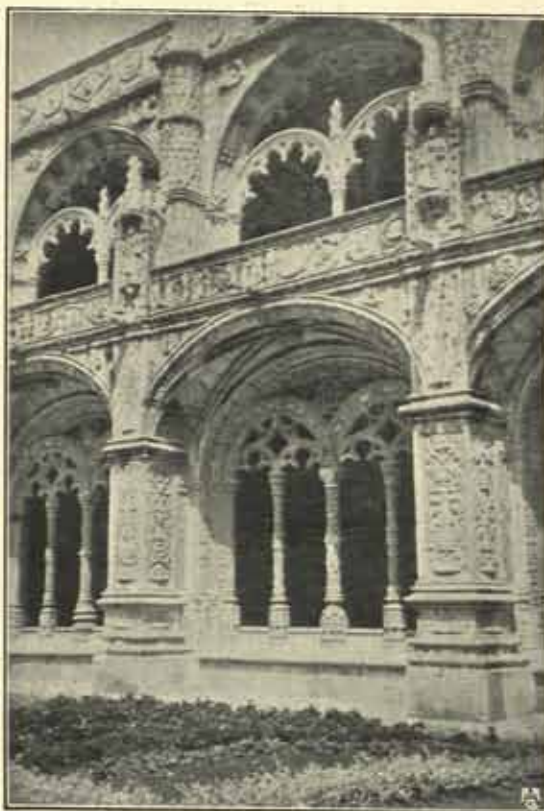


FIG. 14.—CLOISTERS, BELEM.

very top, and have even more to do, as the vault of the transept has a span of 65 feet. The thick north wall is pierced by small confessionals opening alternately from the cloister and the church. The transept chapels were somewhat altered below to make room for royal tombs, and the chancel was rebuilt by Diogo de Torralva in 1551, the year after João de Castilho resigned.

The lower cloister was finished in 1544, and is singularly elaborate. The buttresses are all covered with carvings and are united by small vaults, which help still further to shade the cloister walk. The upper cloister is lighter and more open, and has been lately restored by adding the small arches.

The refectory is a fine large vaulted room lined with tiles; the chapter-house is now unfortunately blocked up by a large tomb, but has a curious apse at the end. The sacristy has a fine vault supported by a beautifully carved column.

The Tower of São Vicente stands not far from the monastery on a sandbank now united to the mainland by gasworks. It was also built by Dom Manoel, and from it Vasco da Gama started on his journey which led him round the Cape to India.

The old palace at Cintra stands in a lovely situation below steep hills still crowned by Moorish fortifications and occupies the site of a Moorish palace. King João, the builder of Batalha, sometimes lived there, but most of what we now see was due to Dom Manoel, who was born there. He added a wing with windows like those of the University Chapel at Coimbra, and gave several of the halls splendid wooden ceilings. The finest is the Sala dos Escudos, so called from the arms with which the roof is painted. Its walls are lined with fine tiles. Another is the Sala dos Cysnos, or Swans, which has below some curious Moorish-looking green and white tiles. The chapel is still more Moorish, and the kitchen like that at Alcobaça has two huge conical chimneys like church spires. As the palace is inhabited by the Queen Dowager, I could only have a quick walk through it and had no time to examine it carefully.

The great hall of the University at Coimbra has also a good example of these high coffered roofs.

The last building of which I am going to speak is the church of São Vicente de Fora in Lisbon—the only church in the town which was not shaken to pieces in 1755, when it only lost its dome. It was built in 1590 from designs either of an Italian, Terzi, who built many similar churches for Philip, which have suffered more, or by a pupil of his, João Tinouco. The church is built of beautiful white limestone, and looks very fine standing high up a steep hill side covered with brown roofed houses. The plan is of a nave, about 36 feet wide, with chapels, transepts, and chancel with square-ended choir behind; between each chapel are two pilasters with good capitals, a kind of Corinthian with two arrows crossed; these carry a Doric cornice, which, by corbelling out the triglyphs over the chapels, is carried round the whole church without a break, and above is a coffered barrel-vault.

After this sober attempt at Italian classic the Portuguese seem to have gone back to a wild exuberance which covered all their later buildings with a profusion of ill-arranged classic detail, often picturesque but never worth very much.





9, CONDUIT STREET, LONDON, W., 23rd July 1904.

CHRONICLE.

THE JUNE EXAMINATIONS.

The Preliminary: newly registered Probationers.

The Preliminary Examination, qualifying for Probationership R.I.B.A., was held in London and the undermentioned provincial centres on the 7th and 8th June. Of the total number entered—viz. 251—58 were exempted from sitting, and the remaining 193 were examined, with the following results:—

Centre	Number Examined	Passed	Relegated
London	84	61	23
Belfast	3	3	0
Birmingham	9	8	1
Bristol	12	10	2
Cardiff	9	5	4
Exeter	4	3	1
Glasgow	5	4	1
Liverpool	4	2	2
Leeds	24	18	6
Manchester	19	13	6
Newcastle	15	11	4
York	5	5	0
	193	143	50

The passed candidates, with those exempted—201 altogether—have been registered as Probationers. The following are their names and addresses:—

ADAMS: Maurice Spencer Rowe; 1 Marlborough Crescent, Bedford Park, Chiswick [St. Paul's School, W. Kensington].
 AITKEN: Andrew Danskine; 2 Forsyth Street, Airdrie, N.B. [Masters: Messrs. Thos. Dykes & Robertson].
 ALLEN: Ernest George; Sunnycroft, Gordon Road, S. Woodford [Master: Mr. J. Williams Dunford].
 ALLFREE: Percy Reginald Henry; 61 Myddelton Square, Clerkenwell, E.C. [Master: Mr. Peters].
 ASHLEY: Joseph Denby; Woodville, Sneyd Park, Bristol [Masters: Messrs. Walter S. Paul * and James *].
 BADENOCH: Henry Sime; 60 Warrington Road, Newcastle-on-Tyne [Masters: Messrs. Badenoch & Bruce].
 BAIRD: George Bong; 135 Greenhead Street, Bridgeton, Glasgow [Masters: Messrs. James Salmon * & Son].
 BAKER: Charles Henry; "Gwalia," 32 Clifton Road, Kingston-on-Thames [Masters: Messrs. Carter * & Ashworth *].

BAMFORD: Frederick Noel; 33 Bulwer Road, Leytonstone, Essex [Master: Mr. E. L. Lutyens].
 BARRACLOUGH: William; Rothesay Villa, Victoria Street, Barnsley [Masters: Messrs. Wade & Turner].
 BARROW: Joseph Benson; 50 East Mount, Barrow-in-Furness [Master: Mr. W. Moss Settle *].
 BARTON: Francis James; 4 King Square, Bridgwater, Somerset [Masters: Messrs. Samson * & Cottam *].
 BATALHA-REIS: Victor Cinatti; 55 St. Quintin Avenue, Notting Hill, W. [University College School, London].
 BAUSOR: Thomas Paul; 98 Mawson Road, Cambridge.
 BEER: Victor; 9 Allington Road, Southville, Bristol [Masters: Messrs. La Trobe * & Weston *].
 BENTLEY: Sydney George; Mona Terrace, Farsley, near Leeds [Master: Mr. A. Sharp].
 BIRBECK: Vernon Hall; Cottingham, Hull, Yorks [Hull Grammar School].
 BIRMINGHAM: Alfred Ernest; Cliff Lodge, Northdown Avenue, Cliftonville, Margate [Herne House School].
 BOLAM: James Ernest; Bowland Terrace, Blaydon-on-Tyne, co. Durham [Masters: Messrs. Mould & Tasker].
 BOLTON: Thomas Henry; 8 Oriental Terrace, Wesley Road, Armley, Leeds [Masters: Messrs. Howdill * & Howdill].
 BOUTCHER: Charles Geoffrey; 91 Enid Street, S.E. [Masters: Messrs. T. Hamilton Crawford & George Jack].
 BRADDOCK: Thomas; 74 Haydons Park Road, Wimbledon, Surrey [Master: Mr. H. W. Braddock].
 BRAZIER: Frederick Henry; Fernside, New Road, Windsor [Master: Mr. J. Saxon Snell].
 BRIERLEY: Reginald Butler; 27 Conduit Road, Bedford [Masters: Messrs. C. E. Mallows * & Grocock].
 BRISTOW: Christopher; 210 Gipsy Road, West Norwood, S.E. [Master: Mr. Frank T. Verity *].
 BRYAN: George Albert; 112 Knightsbridge, S.W. [Polytechnic Architectural School].
 BULLOCK: Arthur Gordon; 10 Woodland Road, New Southgate [Master: Mr. F. L. Pearson *].
 BULLOCK: John Edgar; Hillside, Walton Park, Clevedon, Somerset [Channel View School, Clevedon].
 BURGESS: James Selby; "Enmore," Hillcrest Road, Acton Hill, W. [Master: Mr. C. Stanley Peach *].
 BUSH: Frederick Thwaites; 5 Ella Road, Crouch Hill, N. [Master: Mr. R. G. Hammond].
 CALVERT: Charles Henry; 18 Low Pavement, Nottingham [Masters: Messrs. A. R. Calvert & William R. Gleave *].
 CAREY: James; 58 Pennard Road, Shepherd's Bush, W.
 CARTER: Harold; Hollycombe Farm, Liphook, Hants [Master: Mr. H. T. Keates].
 CLARKE: Albert John Hamilton; Dromore, co. Down, Ireland [Master: Mr. Roome].
 COCK: Roland Henry Liebreich; 2 Tregunter Road, The Boltons, S.W. [Tonbridge School].
 COLE: Charles Ralph; 50 High Street, Exeter, Devon [Master: Mr. Charles Cole].
 COLLINGWOOD: Richard Lord; 4 Selwyn Avenue, Richmond, S.W. [Master: Mr. F. W. Dixon].
 COOPER: Frederick Seymour; 18 William Street, Herne Bay [Master: Mr. R. Messenger *].
 CORE: Frederick Charles; 48 Northumberland Place, Bayswater.
 CORNWELL: Arthur Redfern; 46 Lichfield Street, Hanley, Staffs [Master: Mr. Harry Burgess].
 CORRIGALL: David James; School House, Duffus, Elgin [Master: Mr. John Wittet].
 COUSINS: Lancelot Victor; Taunton School, Taunton.
 COX: Cyril Diodati; 50 Loftus Road, Shepherd's Bush, W. [Master: Mr. Walter Graves *].
 CRAWSHAW: Thomas Herbert; 47 Gawber Road, Barnsley [Holgate's Grammar School, Barnsley].
 CRICHTON: Charles Kennaway; 32 King Street, Perth [Masters: Messrs. Menart & Jarvie].

- CROMIE: Robert; 30 Sisters Avenue, Lavender Hill, S.W. [Sir Walter St. John's School, Battersea].
- CRUSH: John Arnold; 76 Eversleigh Road, Lavender Hill, S.W. [Master: Mr. H. A. Woodington*].
- DAVIES: Joseph Charles; Laurels, Pentrepoth, Morriston, S. Wales [Master: Mr. Charles Thomas].
- DAWSON: Howard Day; 40 Osprings Road, Faversham [Master: Mr. W. G. Dawson].
- DAWSON: William Frederick; 20 Spencer Place, Roundhay Road, Leeds [Giggleswick Grammar School].
- DAWSON: William Roberts; Waterloo House, Gibraltar Road, Halifax [Masters: Messrs. R. Horsfall & Son].
- DENMAN: John Leopold; 8 Clifton Terrace, Brighton [Masters: Messrs. Denman & Matthews].
- DIXON: Isaac; End House, Garmoye Road, Wavertree, Liverpool [Master: Mr. J. Clarke*].
- DONALDSON: Frank; Bedford Lodge, Bishop Auckland [Master: Mr. J. W. Taylor*].
- DRAKE: Francis John; 66 Victoria Road South, Southsea [High School, Arbroath].
- DRAPER: William Basil Yeatman; 19 Campden Hill Square, Kensington, W. [Masters: Messrs. Demaine & Brierley].
- DYER: Bernard Arnold; 3 St. Peter Street, Hereford [Masters: Messrs. Groome* & Bettington].
- EAGAR: Thomas; Downshire Road, Holywood, Belfast [Masters: Messrs. Watt & Tulloch*].
- EATON: Alexander Robert Charles; 203 Neville Road, Forest Gate, E. [Elmhurst Council School].
- FAIRWEATHER: John Matthew; 17 Killarney Street, Dublin [Master: Mr. R. Scott].
- FARRAR: Joseph Henry; 62 Avenue Hill, Harehills, Leeds [Master: Mr. R. Fielding Farrar*].
- FARRELL: John; 106 Hunter Street, Sydney, N.S.W. [Public School, Braidwood, N.S.W.].
- FARROW: George Reginald; 114a Kingswood Road, Clapham Park, S.W. [Battersea Polytechnic].
- FIDLER: Ernest Gordon; Warren Side, Caversham, Oxon. [Master: Mr. W. G. Lewton].
- FITZGERALD: Francis Henry; 247 Minard Road, Hither Green, S.E. [Masters: Messrs. Williamson* & Inglis*].
- FOSTER: Thomas Oliphant; 65 Argyle Road, Ealing, W. [Master: Mr. Ernest Carritt*].
- POWELL: James Aylwin; Grosvenor House, Havelock Road, Hastings [Masters: Messrs. A. W. Jeffery & Sons].
- FULKER: Francis Bertie; "The Bungalow," Stratford Road, Salisbury [Master: Mr. Fred. Bath*].
- GIBBERD: James Vernon; 104 George Street, Croydon [Masters: Messrs. Berney & Son*].
- GIBSON: Edmund Herbert; 5 Beech Grove, Harrogate [Balliol House School, Harrogate].
- GIFFORD: Gordon; 13 Abercorn Place, St. John's Wood, N.W. [Dorchester Grammar School].
- GILL: William; Summerville Terrace, Stanningley, near Leeds [Master: Mr. W. D. Gill].
- GILLOW: William Michael; Brook House, Alderley Edge, Cheshire [Master: Mr. G. H. Willoughby*].
- GILMOUR: Thomas Gilchrist; 22 Monteith Row, Glasgow [Glasgow and West of Scotland Technical College].
- GLAZEBROOK: Charles Nathaniel; 81 Mount Gold Road, Plymouth [Master: Mr. H. J. Snell].
- GOLDSTRAW: Harold; 42 St. John Street, Hanley, Staffs [Master: Mr. W. A. Baynes].
- GORDON: Cameron; The Park, Harrow-on-the-Hill, Middlesex [Harrow School].
- GRADON: Wilfrid George; Lynton House, Durham [Masters: Messrs. Oliver, Leeson, & Wood].
- GRAHAM: Charles James; "Clitheroe," Barrowgate Road, Chiswick, W. [Masters: Messrs. Wadmore* & Mallett].
- GREEN: Edward Rodwell; c/o Messrs. Slatyer & Cosh, George Street, Sydney, N.S.W. [Masters: Messrs. Slatyer & Cosh].
- GRIEVE: James; 4 Hallfield Road, Manningham Lane, Bradford [Masters: Messrs. Sydney Mitchell & Wilson].
- GURNEY: Charles Frederick; 31 Grimthorpe Terrace, Headingley, Leeds [Master: Mr. W. Evan Jones].
- HALL: Herbert William; 34 Sandringham Road, Tue Brook, Liverpool.
- HANSCOMB: Charles Ernest; 73 Jerningham Road, New Cross, S.E. [Master: Mr. A. Roberts].
- HARKER: Frank Miles; Parkstone, Dyke Road, Brighton [Masters: Messrs. Denman and Matthews].
- HARBOLD: William Howieson; Alva, by Alloa, N.B. [Masters: Messrs. Kerr & McCulloch*].
- HARWOOD: Arnold William; 25 Aberdeen Park, Highbury, N. [Master: Mr. G. L. Sutcliffe*].
- HEATH: Samuel Titley; 87 Albert Road, Blackpool [Master: Mr. J. A. Luttall].
- HENDERSON: James David; The Anchorage, Berwick-upon-Tweed [Masters: Messrs. Jas. Stevenson & Son].
- HIGGINS: William Thomas; The Swan, Hanslope, Stony Stratford, Bucks [Masters: Messrs. Law & Harris*].
- HIGGINSON: Harry Scott; 8 Howard Place, Carlisle [Master: Mr. Higginson].
- HIRST: Selwyn; School Terrace, Marsden, Huddersfield [Masters: Messrs. Lunn & Kayes].
- HOPKINSON: James Kenyon; 15 Agur Street, Bury, Lancs. [Master: Mr. Alfred Hopkinson].
- HORTH: Harold Edwin; Bath Street, Hereford [Clyde House School, Hereford].
- HOSKING: Thomas Stanley; 68 Coronation Road, Bristol [Masters: Messrs. La Trobe* & Weston*].
- HOWE: Wilfred; 22 West View, Park Road, Barnsley, Yorks [Master: Mr. P. A. Hinchliffe].
- HOYLE: Wilfred; Cliff House, Greenhithe, Kent [King's College Architectural School].
- HUNOT: Edward La Fontaine; Asfee, Burnt Ash Hill, Lee, S.E. [Master: Mr. Walter Stair].
- HUNTER: George Edward; Wentworth, Gosforth, Newcastle-on-Tyne [Charterhouse].
- HUXLEY: John Scott; Holyrood, 4 Howard Square, Eastbourne [Master: Mr. F. G. Cooke].
- ISAAC: William John; 72 Bewsey Street, Warrington [Master: Mr. S. P. Silcock*].
- ISAACS: Robert Macintosh; 50 Gurner Street, Paddington, Sydney, N.S.W. [Master: Mr. G. Sydney Jones*].
- JACKMAN: Frederick; Weybridge House, Frimley, Surrey [Master: Mr. James Newman].
- JELLEY: Frederick Richard; 14 Henrietta Street, Swansea [Master: Mr. H. C. Portsmouth].
- KAYE: Charles Gordon Bennett; Oriol House, Harpenden, Herts [St. Alban's Grammar School].
- KERSHAW: John Victor; Mason's Arms Hotel, Burnley [Master: Mr. A. Nutter].
- KEYMER: Frank Ernest; Marine Cottage, Black Wall Reach, Gorleston, Great Yarmouth [Master: Mr. Sydney Rivett].
- KIBBLER: Dudley; Ashby House, 3 Manor Road, Stamford Hill [Vermont College, Clapton].
- KIDDLE: Harold Lockett; 39 Lansdowne Road, Tottenham, N. [Master: Mr. Frank E. Smee].
- KNYVETT: John Seymour; Metchley Cottage, Edgbaston, Birmingham [King Edward's High School].
- LAMSTER: Edgar; 59 Richmond Terrace, Darwen [Masters: Messrs. Sames & Green].
- LEVY: Arthur Louis; Cambridge House, Ladbroke Grove, W. [St. Paul's School, West Kensington].
- LINDSAY: William; 11 Moray Place, Glasgow [Master: Mr. James Lindsay*].

CHRONICLE

- LONGDEN: David; 20 Langside Place, Langside, Glasgow [Masters: Messrs. Thomson, Turnbull, & Peacock].
- LOVELL: William Goulburn; St. Moritz, Upper Avenue, Eastbourne [Eastbourne College].
- LOW: Albert Victor; 111 Droop Street, Paddington, W. [Masters: Messrs. Gordon & Gunton*].
- MARCHANT: John George Neale; 79 West Hill Drive, Mansfield [Master: Mr. F. P. Cook].
- MEADUS: Harry Howard; 1 Cecil Road, Rochester [Master: Mr. E. F. Cobb*].
- MERRIMAN: Harold Ian; 27 Young Street, Kensington, W. [Radley College].
- MILNE: Kenneth Herbert; Donington House, Norfolk Street, Strand, W.C. [Masters: Messrs. Sills & Leeds*].
- MITCHELL: Cecil William; "The Grange," Shirley, Southampton [Masters: Messrs. W. H. Mitchell, Son, & Gutteridge].
- MOLE: Herbert William; 49 Warrington Road, Newcastle-on-Tyne [Masters: Messrs. Hicks & Charlewood*].
- MORLEY: Harry; 66 Sydney Street, South Kensington, S.W. [Master: Professor Beresford Pite*].
- MUNT: Francis Edwin Spencer; Linkfield House, Fontenoy Road, Balham, S.W. [Polytechnic, Regent Street].
- MURRAY: Frederick Albert; The Hollies, 52 Albert Drive, Pollokshields, Glasgow [Masters: Messrs. James M. Monro & Son].
- NEAVE: Stacey Arthur; Northwood Road, Longueville, Sydney, N.S.W. [Masters: Messrs. Kent & Budden*].
- NEWBERY: Charles Joseph; Forest View, Battle [Tudor Hall School, Hawkhurst].
- NICHOLL-GARRETT: Edward Augustine; 89 Eign Street, Hereford [Master: Mr. W. W. Robinson].
- NICOL: Walter; "Holmeleigh," 101 Queen's Road, Blackburn [Masters: Messrs. Simpson & Duckworth].
- ODDY: George Reginald; Stone Lodge, Northowram, Halifax [Masters: Messrs. Walsh & Nicholas].
- PARKER: Gilbert; St. Stephen's Lodge, Barbourne, Worcester [Master: Mr. A. Hill Parker*].
- PARRY: George Herbert; "The Den" Upper Warlingham, Surrey [Master: Mr. Mervyn Macartney].
- PEARSON: William Herbert; 63 Westbourne Avenue, Hull [Master: Mr. J. M. Dossor*].
- PEART: Victor Hobart; 5 Beaconsfield Terrace, Gorleston-on-Sea, Great Yarmouth [Master: Mr. J. W. Cockrill*].
- PRIEST: Francis Ralph; 22 Nightingale Gardens, Clapham Common, S.W. [Masters: Messrs. Spalding & Spalding*].
- RAWES: Francis Arthur Montague; Acacia Villa, Colleton Green, Exeter [Master: Mr. Harbottle Reed*].
- READ: Walter Stanley; 7 Stanley Gardens, S. Hampstead, N.W. [Master: Mr. C. J. Harold Cooper].
- RICHARDS: Percy; "Ashlea," Howard Road, Southampton [Masters: Messrs. Herd & Sanders].
- RICHARDSON: Harry Thurston; "Shirley," Handsworth Wood, Birmingham [Master: Mr. Owen P. Parsons].
- RICHINGS: Gerald Acland; "Hillside," Walton Park, Clevedon [Master: Mr. F. Bligh Bond*].
- ROBERTS: Walter William; The Homestead, Court House Lane, Maidenhead, Berks [Master: Mr. Harry Hutt*].
- ROBINSON: Howard Martin; The Elms, Coventry [Mill Hill School].
- ROBSON: Bernard; 1 Albion Street, Victoria Road, Scarborough [Master: Mr. J. C. Petch].
- RODGER: Will Ashton; 8 Conway Road, Cardiff [Master: Mr. G. E. Halliday*].
- ROGERS: John Alfred; 51 Hillfield Road, West Hampstead [Master: Mr. Leslie W. Green*].
- ROSE: Charles Holland; 11 Endlesham Road, Balham, S.W. [Master: Mr. John Slater*].
- ROSS: Harrison; Cultra, Belfast [Masters: Messrs. Graeme-Watt & Tulloch*].
- ROSS: Hugh Alexander; 114 Godolphin Road, Shepherd's Bush, W. [Master: Mr. H. Chatfield Clarke].
- SALWEY: Jasper Philip; c/o Messrs. Ravenscroft, Son, & Morris, 22 the Fortway, Reading, Berks [Masters: Messrs. Ravenscroft, Son, & Morris*].
- SAULT: Richard Trevor; 177 Hinckley Road, Leicester [Wyggeston School, Leicester].
- SCOTT: James Maxwell; 64 Redcliffe Road, South Kensington, S.W. [Master: Mr. A. F. Balfour-Paul].
- SHERLOCK: Edward Denton; 35 Egerton Road, Withington, nr. Manchester [Masters: Messrs. W. Johnson & Sons].
- SHIELDS: Nicholas Villar, Farnham, Allison Road, Randwick, N.S.W. [Master: Mr. Geo. W. Durrell*].
- SIMPSON: Cecil Hamilton; 15 Woburn Place, Russell Square, W.C. [Masters: Messrs. Mayston & Eddison].
- SINGER: William Henry; 5 Royal Buildings, Penarth [Master: Mr. E. M. Bruce Vaughan*].
- SMITH: Harold Edgar; 2 Edgbaston Road, Balsall Heath, Birmingham [Master: Mr. A. Freeman Smith].
- SMITH: Reginald Field; 38 Albany Street, Hull [Master: Mr. John M. Dossor*].
- SMITH: Robert Gardner Paget; 133 London Road, Reading, Berks [Master: Mr. W. G. Lewton].
- SOMERSET: James Herbert; Kersal House, Kersal, Manchester [Masters: Messrs. Moulds & Porritt].
- STABLER: Arthur William; Prospect Terrace, Shincliffe, nr. Durham [Master: Mr. Wm. Crozier].
- STAMFORD: Alfred Arthur; 89 Norwich Street, Cambridge [Masters: Messrs. J. Carter Jonas & Sons].
- STELFOX: Arthur Wilson; Oakleigh, Ormeau Park, Belfast [Master: Mr. W. J. Fennell].
- STUBINGTON: William Henry; Booker's Lee, Cranleigh [Master: Mr. E. L. Lunn].
- SUTCLIFFE: Alexander Keighley; Felliscliffe, Ripley, Yorkshire [Master: Mr. J. M. R. Smetham].
- SUTTON: Cecil Alfred Leonard; Ivy Bank, Grove Avenue, Southey Street, Nottingham [Master: Mr. Ernest R. Sutton].
- SWAIN: Charles; "Greenwood," Buxton [Masters: Messrs. W. Telford Gunson & Son].
- TAYLOR: Edward Alexander; "Ben Ledi," Shirley Road, Wollstonecroft, North Sydney, N.S.W. [Master: Mr. J. Burcham Clamp].
- TAYLOR: Samuel Pointon; 33 Broad Street, Hanley, Staffs [Master: Mr. W. A. Baynes].
- THOMAS: Gordon; Maes-y-gollen, Sketty, R.S.O., Glam. [Master: Mr. Charles J. Thomas].
- THOMPSON: Newton Dukinfield; The Avenue, Whyteleafe, Surrey [Uppingham School].
- TODD: Ernest Victor; County Chambers, Abingdon Street, Blackpool [Master: Mr. J. T. Todd].
- TOM: Nai; 47 Cathedral Road, Cardiff [Masters: Messrs. James & Morgan].
- TOWERS: John William; 43 Church Road, Lytham [Master: Mr. T. C. Grimble*].
- TURNBULL: Albert; 1 The Oaks, Sunderland [Masters: Messrs. W. & T. R. Milburn*].
- TURNBULL: Frederick Lorraine; 27 Malvern Street, Elswick Road, Newcastle-on-Tyne [Master: Mr. F. W. Purser].
- TURNER: William Truelove; Redbrook, Barnsley [Masters: Messrs. R. & W. Dixon].
- VERNON: Frederick Austin; 7 Martell Road, West Dulwich, S.E. [Master: Mr. Horace Field*].
- WALKER: Henry Coulton; 3 The Poplars, Ulverston, Lancs. [Master: Mr. Dean J. Brundrit*].
- WALTON: Arthur Reginald; 12 Percy Avenue, Cullercoats, Whitley Bay, R.S.O., Northumberland [Masters: Messrs. Liddle & Browne].

- WARD: Frank Dorrington; Poynings, Park Road, Hastings [Master: Mr. H. Ward *].
- WARD: Sidney James; 17 Abington Avenue, Northampton [Master: Mr. T. Dyer].
- WEBSTER: Frank Coutts; Hermon Cottage, Broughty Ferry, Scotland [Master: Mr. Robert Keith].
- WEBSTER: William Ross; 4 Rosebery Street, Aberdeen [Master: Mr. R. G. Wilson *].
- WELFORD: Arthur; 37 Mapesbury Road, Brondesbury, N.W. [Master: Mr. E. J. May].
- WHITEING: Richard Henry; Union Road, Beverley, East Yorks [Master: Mr. B. S. Jacobs].
- WHITELAW: James; 51 St. Andrews Dr., Pollokshields, Glasgow [Master: Mr. Alexander Skirving].
- WIGZELL: Norman; 249 Park Road, Barnsley, Yorks [Master: Mr. G. T. Brown].
- WILKS: John; 22 Bridge Road, Stockton-on-Tees [Grammar School, Stockton-on-Tees].
- WILLIAMS: Edward Sidney; Taunton School, Taunton [Taunton School].
- WILLMAN: John Henry; "Merrivale," Northampton Road, Wellingborough [Masters: Messrs. Sharman & Archer].
- WILSHERE: Reginald Sharman; Craven House, Princess Road, Leicester [Eastbourne College].
- WILSON: Denis Medland; Rivers Lodge, Harpenden, B.S.O., Herts [A.A. Day School].
- WILSON: Ralph; 17 Cressingham Road, Lewisham, S.E. [Masters: Messrs. Thomas Dinwiddy & Sons].
- WILSON: William Hardy; Emu Street, Burwood, Sydney, N.S.W. [Masters: Messrs. Kent & Budden *].
- WINGROVE: George Christopher; Bow, Durham [Masters: Messrs. Cackett & Burns Dick].
- WINTERSGILL: Gerald Walker; 17 Ayresome Grange Road, Middlesbrough [Masters: Messrs. Moore & Archibald].
- WOOD: Arthur Stewart; 64 Redcliffe Road, South Kensington, S.W. [Master: Mr. J. A. Ogg Allan].
- WORROW: Frederick; Maida Villa, Snakes Lane, Woodford, Essex [Master: Mr. W. H. Duffield *].
- WRIGHT: Walter Harold; 85 Culvert Road, Battersea Park Road, Battersea, S.W. [Sir Walter St. John's School].
- YOUNG: James Reid; Rathvarna, Chichester Park, Antrim Road, Belfast [Masters: Messrs. Young & Mackenzie].
- YOUNG: Norman Leslie; Park House, Royton, near Oldham, Lancs. [Master: Mr. T. W. Hooley *].

The asterisk (*) denotes members of the Institute.

The Intermediate: newly registered Students.

The Intermediate Examination, qualifying for *Studentship R.I.B.A.*, was held in London and the undermentioned provincial centres on the 7th, 8th, 9th and 10th June. One hundred and forty-three candidates were examined, with the following results:—

Centre	Number Examined	Passed	Relegated
London	100	47	53
Belfast	2	1	1
Bristol	7	5	2
Glasgow	3	2	1
Leeds	13	10	3
Manchester	11	8	3
Newcastle	7	4	3
	143	77	66

The successful candidates, who have been registered as Students, are as follows, the names being given

in order of merit, as placed by the Board of Examiners:—

- SMITH: John Myrtle [Probationer 1889]; 8 Trafalgar Square, Chelsea, S.W. [Master: Mr. James S. Gibson *].
- THORP: Ralph Windsor [Probationer 1901]; Chadeote, Barton Crescent, Headingley, Leeds [Master: Mr. William H. Thorp *].
- RICHARDS: Harold Beckwith [Probationer 1903]; R.E. Office, Buttevant, co. Cork [Master: Mr. Alex. McGibbon *].
- BECK: John Jackson [Probationer 1901]; "Inveresk," Thorne Road, Doncaster [Masters: Messrs. Athron & Beck].
- PENFOLD: John Thomas [Probationer 1903]; 13 Studland Street, Hammersmith, W. [Masters: Messrs. Roumieu & Aitchison *].
- WATSON: Bryan [Probationer 1901]; 3 Rosella Place, North Shields [Master: Mr. J. Walton Taylor *].
- CONSTABLE: Vernon [Probationer 1902]; Ferndene Cottage, Cornhill Street, Springburn, Glasgow [Masters: Messrs. James Salmon & Son & Gillespie].
- WARREN: Percy Francis [Probationer 1901]; Montpellier House, Clarendon Road, Norwich [Master: Mr. George J. Skipper *].
- PERKINS: Cecil Henry [Probationer 1899]; St. Kilda, Wokingham, Berks [Master: Mr. Fred T. Beck].
- WORMALD: Harry [Probationer 1902]; 28 St. Luke's Road, Beeston Hill, Leeds [Master: Mr. W. S. Braithwaite].
- BLUHM: Quentin Mangnall [Probationer 1902]; Glencoe, St. Anne's-on-the-Sea, Lancashire [Master: Mr. Edward Hewitt *].
- BLANC: Louis [Probationer 1897]; 10 Wharfedale Street, Earl's Court, S.W. [Master Mr. Hippolyte J. Blanc *].
- MATHESON: Kenneth William [Probationer 1903]; "Orcadia," Goulton Road, Clapton, N.E. [Master: Mr. Leonard V. Hunt *].
- FAIRHEAD: Herbert Allan [Probationer 1903]; Riverside, Enfield, N. [Master: Mr. Arthur W. Cooksey *].
- RHODES: Thomas Herbert; [Probationer 1900]; "Eamont," Shaftesbury Avenue, Roundhay, Leeds [Master: Mr. H. Ascough Chapman *].
- MAKINS: Clifford Copeman [Probationer 1903]; Westthorpe, Harrow [Master: Mr. W. D. Caroë *].
- HEPBURN: James William [Probationer 1902]; 21 Claverton Street, S.W. [Master: Mr. E. Vincent Harris *].
- OLIVER: Bruce William [Probationer 1902]; Bridge End, Barnstaple [Master: Mr. W. C. Oliver].
- RILEY: William Henry [Probationer 1903]; 98 St. Saviour's Road, Leicester [Master: Mr. Frank Seale].
- WADE: Charles Paget [Probationer 1902]; Elmale, Yoxford, Suffolk [Masters: Messrs. Bisshopp & Cantley].
- MORLAND: Geoffrey [Probationer 1901]; 73 Morland Road, Croydon [Master: Mr. Arthur Keen *].
- HOBSON: Joseph Reginald [Probationer 1901]; Clevedon, Main Road, New Eltham, S.E. [Master: Mr. Alfred Conder *].
- SPENCE: Herbert Marshall [Probationer 1902]; Bank House, North Shields [Masters: Messrs. Liddle & Browne].
- FOSTER: Reginald Charles [Probationer 1900]; Newton House, Loughton, Essex [Master: Mr. H. Tooley *].
- CLARK: Duncan Walter [Probationer 1902]; 7 Sion Row, Twickenham [Master: Mr. Howard Goadby].
- HOLT: Harold Gay [Probationer 1901]; 34 Chorley New Road, Bolton [Master: Messrs. Cunliffe & Pilling *].
- MARWICK: Thomas Craigie [Probationer 1898]; 43 York Place, Edinburgh [Master: Mr. T. P. Marwick *].
- SPILLER: Reginald George [Probationer 1899]; "Hatfield," Taunton, Somerset [Master: Mr. F. W. Roberts].

- SURMAN: John Burgess [Probationer 1902]; 10 Yew Tree Road, Edgbaston, Birmingham [Masters: Messrs. C. Whitwell & Son].
- JAMES: John Milton [Probationer 1902]; c/o Messrs. S. J. Wilde & Fry, Boulevard Chambers, Weston-super-Mare [Master: Mr. S. J. Wilde].
- SMITH: Stephen Percy, B.A. Oxon. [Probationer 1903]; c/o S. E. Smith, Esq., 12 South Parade, Leeds [Master: Mr. S. E. Smith *].
- STONE: George Marrison [Probationer 1900]; The Chauntry, Tuxford, Notts [Master: Mr. H. H. Dunn *].
- CARDER: Arthur Alfred [Probationer 1898]; 4 The Chase, Clapham Common, S.W. [Master: Mr. Hampden W. Pratt *].
- HODDER: Eric Edwin [Probationer 1903]; 16 Whitehall Road, Thornton Heath, Surrey [Master: Mr. G. F. Carter].
- BRICKNELL: Thomas Mortimore [Probationer 1903]; 22 Richmond Gardens, Shepherd's Bush Green, W. [Master: Mr. Albert L. Guy *].
- DALRYMPLE: Hugh Alexander [Probationer 1903]; c/o Ellis, 44 Leamington Terrace, Edinburgh [Master: Mr. Marham].
- ADAMS: Henry Eustace [Probationer 1902]; 162 Brixton Road, Brixton, S.W. [Master: Mr. John Glenn].
- BAIRD: William [Probationer 1902]; 97 Gower Street, W.C. [King's College, London].
- CUBEY: Joseph Berkeley [Probationer 1900]; 25 Osborne Avenue, South Shields [Master: Mr. J. Walter Hanson].
- DOWNS: Harry Beecroft [Probationer 1901]; Shaw Side, Guiseley, Yorks [Master: Mr. Harold Chippindale].
- TALL: Robert John [Probationer 1900]; 7 The Grove, Gravesend.
- BRIDGMAN: Gordon Brock [Probationer 1902]; 1 Camden Square, N.W. [Masters: Messrs. Hudson * & Hunt *].
- DUNN: Gerald Morton [Probationer 1902]; 1 and 2 Bucklersbury, Cheapside, E.C. [Master: Mr. W. Newton Dunn *].
- DREWITT: Colin Minors [Probationer 1902]; 55 Belmont Street, Southport, Lancs [Master: Mr. Goodwin S. Packer].
- JOHNSON: William Herbert [Probationer 1901]; 8 King Street, Great Yarmouth [Master: Mr. J. Wm. Cockrill *].
- THOMPSON: Morris [Probationer 1901]; Brentwood, Regent Square, Doncaster [Master: Mr. W. H. Bourne *].
- OSLER: Francis [Probationer 1899]; 37 Camberwell Grove, S.E. [Masters: Messrs. Thos. Worthington * & Son *].
- STAHL: Max Edward [Probationer 1903]; Westfield, Uphill, Weston-super-Mare [Masters: Messrs. Hans Price & William Jane].
- BOWN: Harold Linley [Probationer 1901]; 11 Grove Road, Harrogate [Masters: Messrs. H. E. & A. Bown].
- SMITH: Charles Benjamin [Probationer 1902]; Aeneia Villa, North Hill Road, Ipswich [Masters: Messrs. Bisshopp & Cantley *].
- MACKAY: William Alex. [Probationer 1902]; 17 Norfolk Road, Seven Kings, Ilford, Essex [Masters: Messrs. Niven * & Wigglesworth *].
- JARRETT: George William [Probationer 1902]; 5 Doricote Road, Wandsworth Common [Masters: Messrs. Young * & Hall *].
- KIRK: Alastair Hope [Probationer 1901]; New Oxford & Cambridge Club, 68 Pall Mall, S.W. [Master: Mr. Ernest George *].
- SUTCLIFFE: William [Probationer 1902]; 29 Wellington Road, Todmorden [Masters: Messrs. Sutcliffe & Sutcliffe *].
- HILL: Bertram Charles [Probationer 1899]; Stapleton Rectory, Bristol [Master: Mr. Frederick Shone].
- CROSSLEY: Ernest Barraclough [Probationer 1893]; 23 Osborne Grove, Sherwood, Nottingham [Master: Mr. M. Robinson *].
- ADDIS: David Malcolm [Probationer 1902]; 34 Hermitage Gardens, Edinburgh [Masters: Messrs. Hay & Henderson].
- BROUGH: Wilfred James [Probationer 1902]; 29 Alexandra Villas, Finsbury Park, N. [Master: Mr. C. Val Hunter *].
- CALTHROP: William Wellesley James [Probationer 1901]; Risegate, Farncombe, Surrey [Masters: Messrs. Clare & Ross *].
- CARNELLEY: Herbert [Probationer 1901]; Southfield, Barnsley, Yorkshire [Masters: Messrs. Perkin * & Bulmer *].
- CLARKE: William Thomas [Probationer 1901]; 225 West Derby Road, Liverpool [Masters: Messrs. Ware & Rathburn].
- COOK: John Oliver [Probationer 1900]; North End Villa, Wrottesley Road, Plumstead, S.E. [Masters: Messrs. J. & S. Flint Clarkson *].
- GRIBBON: Blakeley Rinder [Probationer 1901]; c/o Messrs. Chorley, Connon & Chorley, 16 Park Place, Leeds [Master: Mr. H. S. Chorley *].
- GUTTERIDGE: Reginald Fowler [Probationer 1901]; Littlecroft, Northlands Road, Southampton [Masters: Messrs. Mitchell, Son, & Gutteridge].
- HASNIP: Arthur Hugh [Probationer 1901]; "Chalvington," Baldslow Rd., Hastings [Master: Mr. P. H. Tree *].
- HAZARD: Cecil James [Probationer 1900]; 28 Aden Grove, Stoke Newington, N. [Master: Mr. G. A. Bligh Livesay *].
- HENNELL: Sidney Thorn [Probationer 1900]; 16 Earlsfield Road, Wandsworth Common [Master: Mr. E. W. Mountford *].
- HIRD: Henry Dennis [Probationer 1901]; St. Mary's Vicarage, Halifax, Yorkshire [Masters: Messrs. Milnes & France *].
- JACKSON: Edwin Arthur [Probationer 1899]; 44 Gathorne Road, Wood Green, N. [Masters: Messrs. Bottle & Olley].
- JONES: Norman [Probationer 1903]; 38 Knowsley Road, Southport [Master: Mr. Henry Jones].
- KEASLEY: John Norman [Probationer 1900]; The Hawthorns, Meadvale, Redhill [Master: Mr. Latham A. Withall *].
- LANGMAN: Francis William [Probationer 1900]; 22 St. James's Square, Notting Hill, W. [Masters: Messrs. Treadwell & Martin].
- LELLO: Thomas Stanley [Probationer 1899]; 4 Eastwood Road, Goodmayes, Essex [Master: Mr. Joseph Smith *].
- MINOR: Philip [Probationer 1898]; Araxie, 70 Palatine Road, West Didsbury, Manchester [Masters: Messrs. Sankey & Cubbon *].
- PURSGLOVE: Archibald [Probationer 1901]; 92 Dentons Green Lane, St. Helen's, Lancs. [Masters: Messrs. J. M. Wilson & Son].
- SINCLAIR: William Charles Braxton [Probationer 1900]; Lynton, Bexley, Kent [Master: Mr. Edgar S. Underwood].
- WESTWICK: Bertie Cecil [Probationer 1902]; "Hillcrest," Mansfield, Notts [Master: Mr. A. N. Bromley *].

The asterisk (*) denotes members of the Institute.

The Final and Special.

The Final and Special Examinations, qualifying for candidature as *Associate R.I.B.A.*, were held in London from the 24th to the 30th June. Of the 67 candidates admitted, 32 passed, and 85 were relegated in certain subjects. The following are the names and addresses of the passed candidates,

the † prefixed to a name signifying that the candidate passed the Special Examination designed for candidates exempted by resolution of the Council from the Preliminary and Intermediate Examinations and from submitting Testimonies of Study:—

ALLEN: Ernest Gladstone [*Probationer* 1900, *Student* 1902]; 10 Morland Road, Croydon.
 †ALLISON: Richard John [*Special Examination*]; 26 Whatman Road, Honor Oak Park, S.E.
 BAGOT: Walter Hervey [*Probationer* 1901, *Student* 1903]; 1 Park Crescent, Portland Place, W.
 BALL: William John [*Probationer* 1895, *Student* 1896]; 12 Pickmere Street, Warrington.
 BATES: Ernest [*Probationer* 1894, *Student* 1897]; 2 Imperial Buildings, East Croydon.
 BATLEY: Claude [*Probationer* 1898, *Student* 1903]; Little Roundwood, Ipswich.
 BROWN: William Edward Arthur [*Probationer* 1899, *Student* 1901]; 98 Paulet Road, Camberwell, S.E.
 CAMPBELL: Archibald Neil [*Probationer* 1900, *Student* 1901]; "Lansdowne," Hampton-on-Thames.
 CHILDS: Charles Michael [*Probationer* 1896, *Student* 1899]; 15 Lewisham Road, Highgate Road, N.W.
 CHILWELL: Benjamin Charles [*Probationer* 1898, *Student* 1900]; Oakeswell, Wednesbury.
 CLEVELAND: Charles Barry [*Probationer* 1899, *Student* 1901]; 15 Earl's Court Gardens, S.W.
 †COOK: James Charles [*Special Examination*]; Cape Town, South Africa.
 CULLEY: Norman [*Probationer* 1901, *Student* 1902]; 128 Bradford Road, Huddersfield.
 †CURTIS: Spencer Carey [*Special Examination*]; 17 Southampton Street, Bloomsbury, W.C.
 CURTIS: William Thomas [*Probationer* 1898, *Student* 1901]; Harbledown, 7 South Croxted Road, West Dulwich, S.E.
 DAVIES: William James [*Probationer* 1897, *Student* 1899]; Thornton Dene, Sidcup, Kent.
 GLOYNE: Alfred Harry [*Probationer* 1891, *Student* 1894]; 18 Grosvenor Road, Richmond, Surrey.
 GORDON: Henry Percy [*Probationer* 1894, *Student* 1901]; Parkfield, Harrow-on-the-Hill.
 HAWKINS: Percival William [*Probationer* 1894, *Student* 1900]; 42 King's Hall Road, Beckenham.
 HOOPER: Basil Bramston [*Probationer* 1902, *Student* 1902]; 21 Crowhurst Road, Brixton, S.W.
 HOOPER: Vincent [*Probationer* 1896, *Student* 1900]; Elms Road, Redhill, Surrey.
 PILLING: Percy Cunliffe [*Probationer* 1899, *Student* 1902]; 37 Mawdsley Street, Bolton.
 ROBINSON: Kenneth Duncan Stuart [*Probationer* 1901, *Student* 1901]; 7 Carteret Street, Westminster, S.W.
 †ROSS: George Allen [*Special Examination*]; 4619 St. Catherine Street, Montreal, Canada.
 SAWDAY: Tom Trevor [*Probationer* 1900, *Student* 1903]; Briarwood, Springfield Road, Leicester.
 SCOTT: Archibald, jun. [*Probationer* 1898, *Student* 1901]; 6 Broom Park Terrace, Dennistown, Glasgow.
 SEARLE: Norman Odell [*Probationer* 1897, *Student* 1903]; Paternoster House, E.C.
 STEWARDSON: Robert Ernest [*Probationer* 1900, *Student* 1902]; 32 Huron Road, Upper Tooting, S.W.
 STRATTON: Frank Edward [*Probationer* 1897, *Student* 1900]; The Chestnuts, Figgs Marsh, Upper Mitcham.
 WESTWOOD: Percy James [*Probationer* 1898, *Student* 1902]; 130 Jermyn Street, Haymarket, S.W.
 †WIDDOWS: George Henry [*Special Examination*]; Borough Surveyor's Office, Derby.
 WILSON: Frank [*Probationer* 1893, *Student* 1896]; 225 Nottingham Street, Sheffield.

The following shows the number of failures in each subject of the Final:—

I. Design	20
II. Mouldings &c.	33
III. Materials	20
IV. Sanitation	14
V. Specifications	17
VI. Construction: Foundations, Walls, &c.	9
VII. Construction: Iron and Steel &c.	22

Board of Architectural Education.

The following additional appointments as advisory members have been made:—

Sir Isambard Owen, M.D., to represent the University College of South Wales and Monmouthshire;

Professor Elsey Smith, to represent King's College, London.

The other members of the Board were given in the JOURNAL for 25th June, p. 455.

The R.I.B.A. Visit to Newcastle-on-Tyne.

The following arrangements have so far been made for the Institute visit to Newcastle-on-Tyne, where the Annual Dinner will be held on Friday, the 7th October.

Members will be welcomed on their arrival at Newcastle on Thursday evening, 6th October, by an influential local Committee at the County Hotel, Newcastle, which will be the headquarters of the Institute during the visit.

On Friday the 7th October the Right Worshipful the Mayor (Mr. Alderman A. P. Andersen) will receive the members at the Council Chamber at 10 a.m., and deliver an address of welcome on behalf of the City of Newcastle.

The members will then adjourn to the Lecture Theatre of the North of England Institute of Mining and Mechanical Engineers, where the President of the Institute will take the chair, for the purposes of a conference on matters of interest to the profession. The Cathedral Church of St. Nicholas and Trinity House will be visited during the morning.

At the conclusion of the conference the members of the Northern Architectural Association will entertain the visiting members at luncheon at the County Hotel.

Arrangements will be made to enable members to visit in the afternoon "Jesmond Dene House," the residence of Sir Andrew Noble, K.C.B., and "Jesmond Towers," the residence of Charles Mitchell, Esq., returning through Jesmond Dene.

In the evening, at 7.30, the Annual Dinner of the Institute will be held at the County Hotel.

On Saturday the 8th October arrangements will be made (for those who desire to do so) to visit Hexham Abbey and the Roman Station at the Chesters, Chollerford, under the guidance of local members.

Members will be able to return to the South *via*

Newcastle, or those who prefer to do so can proceed to Carlisle and the Lake District, and return by the West Coast route.

A handbook is in course of preparation, containing full information as to hotels, train times, places of rendezvous, &c., and will be sent to any member who decides to attend the meeting.

Seventh International Congress of Architects, 1906.

At the closing meeting of the General Committee of the Sixth International Congress, Madrid, 1904, the following were appointed as British Members of the Permanent Committee of the International Congresses of Architects:—

Mr. John Belcher, A.R.A.
Mr. Aston Webb, R.A.
Mr. T. E. Colcutt.
Mr. Henry T. Hare.
Mr. Alexander Graham.
Mr. John Slater.
Mr. Leonard Stokes.
Mr. John W. Simpson.
Mr. W. J. Locke.

The Council of the Institute have appointed the above to be the Executive Committee of the Seventh International Congress, with power to add to their numbers.

The Committee have met and made the following additional appointments:—

Mr. T. W. Cutler.
Mr. Reginald Blomfield.
Mr. Mervyn Macartney.

The President of the Institute is *ex officio* President of the Congress, and the Secretary of the Institute is Secretary of the Executive Committee.

As a first step, His Majesty the King has been approached through the Keeper of the Privy Purse, and His Majesty has graciously consented to accord his patronage to the Seventh International Congress.

Council Appointments to Standing Committees.

The following appointments to the Standing Committees of the Institute have been made by the Council under By-law 46:—

ART COMMITTEE.—Sir L. Alma-Tadema, R.A. [H.F.], Messrs. George Frampton, R.A. [H.A.], T. Raffles Davison [H.A.], A. W. S. Cross [F.], and Leonard Stokes [F.].

LITERATURE COMMITTEE.—Messrs. Francis Bond, M.A. [H.A.], J. D. Crace [H.A.], Colonel Lenox Prendergast [H.A.], Francis W. Bedford [F.], and A. C. Blomfield, M.A. [F.].

PRACTICE COMMITTEE.—Messrs. C. Fitzroy Doll [F.], Ernest Flint [F.], Sydney Perks [F.], E. R. Hewitt [A.], and H. A. Satchell [A.].

SCIENCE COMMITTEE.—Messrs. F. N. Jackson [H.A.], F. T. Reade [H.A.], A. T. Walmisley [H.A.], F. R. Farrow [F.], and Benjamin Tabberer [F.].

Miller Arcade, Preston.

The Council, having inquired into the matter, have much pleasure in stating that there are no grounds whatever for the allegations made against Messrs. Essex [F.] and Nicol [A.], of Birmingham, with reference to the Miller Arcade, Preston, of which building they were the architects.

M. Choisy.

Mr. Aston Webb, R.A., *Past President*, sends for publication the following extract from a letter addressed to him by M. Choisy on the subject of his recent visit to England to receive the Royal Gold Medal:—

Paris, 25 Juin 1904.

MONSIEUR LE PRÉSIDENT ET TRÈS HONORÉ MAÎTRE,—Permettez-moi, en quittant la contrée hospitalière où je vois maintenant une patrie d'adoption, de vous renouveler la cordiale et respectueuse expression de la reconnaissance que je ressens pour l'accueil inouï dont j'ai été honoré; mon admiration pour les souvenirs d'art que je rapporte; inutile d'ajouter, mon impérissable gratitude pour cette distinction sans égale qui fait de mon voyage le plus grand événement de ma vie. Je me rappelle avec ravissement ce cordial "at home" où les "holiday sketches" ajoutaient tant de charme à l'accueil de leurs auteurs, ce dîner confraternel du grand jour, ces paroles de bienveillante sympathie qui consacrent comme la plus haute des sanctions les efforts de ma carrière.

Permettez-moi, cher Président, de vous renouveler, tant en votre nom personnel qu'au nom du R. I., le témoignage d'un attachement sans réserve et d'une reconnaissance qui durera autant que ma vie.

Votre respectueusement et cordialement dévoué,
A. CHOISY.

Portraits of Past Presidents R.I.B.A.

An Album of Portraits of Past Presidents, reproduced by photogravure from original paintings in the possession of the Royal Institute, has been prepared under the direction of a Committee of the Council, assisted by Sir L. Alma Tadema, R.A. [H.F.]. The album, which is in half morocco, contains sixteen plates (India proofs) and nine blank leaves, with plate-marks for the insertion of India proofs of future portraits. A specimen may be seen in the Library, and members may obtain copies at the price of two guineas. The subjects are as follows:—

Thomas Philip Earl de Grey (*Pres.* 1835-59; *b.* 1781, *d.* 1859), painted by J. Wood, after Wm. Robinson.

Charles Robert Cockerell, R.A. (*Pres.* 1860; *b.* 1788, *d.* 1863), painted by W. Boxall, R.A.

Sir William Tite (*Pres.* 1861-63 and 1867-70; *b.* 1798, *d.* 1873), painted by J. P. Knight, R.A.

Thomas L. Donaldson (*Pres.* 1863-65; *b.* 1795, *d.* 1885), painted by C. Martin.

A. J. Beresford Hope (*Pres.* 1865-67; *b.* 1820, *d.* 1887), painted by C. Martin. Save Earl de Grey, the only President who was not a professional architect.

Thomas Henry Wyatt (*Pres.* 1870-73; *b.* 1807, *d.* 1880), painted by George Richmond, R.A.

Sir George Gilbert Scott, R.A. (*Pres.* 1873-76; *b.* 1811, *d.* 1878), painted by George Richmond, R.A.

Charles Barry (*Pres.* 1876-79; *b.* 1824, *d.* 1900), painted by Lowes Dickinson.

John Whichcord (*Pres.* 1879-81; *b.* 1823, *d.* 1885), painted by Sir Lawrence Alma Tadema, R.A.

George Edmund Street (*Pres.* 1881; *b.* 1824, *d.* 1881), bust by H. H. Armistead, R.A.

Sir Horace Jones (*Pres.* 1882-84; *b.* 1819, *d.* 1887), painted by Frank Holl, R.A.

Ewan Christian (*Pres.* 1884-86; *b.* 1814, *d.* 1895), painted by W. W. Ouless, R.A.

Alfred Waterhouse, R.A. (*Pres.* 1888-91), painted by W. Q. Orchardson, R.A.

J. Macvicar Anderson (*Pres.* 1891-94), painted by Charles W. Furze, A.R.A.

Francis Cranmer Penrose (*Pres.* 1894-96; *b.* 1817, *d.* 1903), painted by John S. Sargent, R.A.

George Aitchison, R.A. (*Pres.* 1896-99), painted by Sir Lawrence Alma Tadema, R.A.

On the interleaves of the Album are given lists of the subjects' principal works.

Obituary.

We regret to announce the decease of the following members:—

Richard Knill Freeman, of Manchester and Bolton, *Fellow*, elected 1882. Died 23rd June.

Frank Manoh Kent, of Pietermaritzburg, Natal, *Fellow*, elected March 1904. Died 7th July.

Arthur Green, *Fellow*, elected 1879. Died 11th July.

Percy William Barrett, of Grahamstown, Cape Colony, *Associate*, elected 1888. Died 3rd January.

Ernest Simm, of Assiniboia, Canada, *Associate*, elected 1902. Died 2nd September 1903.

The New Curator of the Soane Museum.

Mr. Walter L. Spiers [*A.*] has been appointed to the Curatorship of the Soane Museum, vacant by the death of Mr. G. H. Birch. He had already had some experience of the duties of the post, having assisted in the work during Mr. Birch's illness. Mr. Spiers, who was educated in the Engineering Department, King's College, received his architectural training in the office of his brother, Mr. R. Phené Spiers [*F.*]. He joined the Architectural Association in 1866, and won the first prize in the Class of Design and Sir W. Tite's prize for a design for a town church. He passed the Institute Voluntary Architectural Examination in the Class of Proficiency in 1870, gained a silver medal for measured drawings of Eastbury Manor House in 1873, and became an Associate of the Institute in 1874. In 1882 he passed the Examination for District Surveyors, and was subsequently appointed

Surveyor for the District of Charlton, Kidbrooke, and Lee. Mr. Spiers is giving up his professional work, and will devote himself entirely to his new duties.

Exploration of the Roman Forum.

The Rome correspondent of *The Times*, describing the results of Commendatore Boni's most recent excavations at the Roman Forum, calls attention to the value of the bucchero ware discovered as an indication of date.

A large quantity of bucchero ware is still forthcoming from the excavation of the Sepulcretum situated by the side of the Via Sacra, at the foot of the Temple of Faustina. But its presence in these tombs of a primitive people only tends to confirm preconceived theories, and therefore causes no surprise. Signor Boni has published an interesting account of his discoveries on this spot in the *Nuova Antologia* of the 16th February of this year. Seventeen more tombs have been uncovered since that date, raising the total number to-day to forty-two, though no new characteristics have been revealed.

Bucchero ware, however, has been found in another deposit of which the date—and that a comparatively recent one—is by no means uncertain. The discovery last year by Signor Boni of the base of the equestrian statue of Domitian seems at last to have won general acceptance. Relying on a theory of his own, based upon the customary rites of ancient inauguration, and now proved to be well grounded, Signor Boni made an opening in the middle of the east side of the concrete base in search of the foundation-stone. This stone, consisting of a cubic block of travertine containing a carefully cut square chamber, and covered by a large flat travertine slab, was found at once. On the removal of the travertine slab there were discovered in the chamber five vases, of which three were of the ordinary bucchero type and the other two of red ware, but of the same antique form. Inside one of the vases were found traces of charcoal and a small fragment of gold ore. The interest of this discovery lies in the presence of bucchero in a monument of so late a period; for nobody had ever supposed that the use of pure bucchero, for ritual or other purposes, had continued so late as the time of Domitian, and its presence had been hitherto generally considered a reason for assigning an almost prehistoric date to the tombs and other receptacles in which it was found.

The discovery of the base of the Domitian statue led Signor Boni to search for that of another equestrian monument—mentioned both by Pliny and Livy—the statue of Quintus Marcius Tremulus. His quest was rewarded with immediate success, and the unmistakable remnants of the base of the statue are now uncovered just in

front of the Temples of Cæsar and of Castor. Pliny's description of this statue is but scanty, so that its actual form is unknown; nor is it easy to estimate its size from the fragments of the base which are now existing.

A more interesting discovery is that of the remains of the monument that was supposed to mark the spot of the Lacus Curtius. These were uncovered to the west of the Domitian statue, and close to one of the fourth-century honorary columns. The area has not yet been fully explored, but it seems to contain the remains of a circular altar of tufa, with small pits and a gutter for sacrifice. The orientation is that of the earlier buildings of the Forum, and the sanctity of the spot is shown, as in the case of the tomb of Romulus, by a very late kerbing on the superimposed Imperial pavement. The remains which are now visible probably belong to an altar of a period not later than Julius Cæsar.

MICHELANGELO AS ARCHITECT.

BARON VON GEYMÜLLER [*Hon. Corr. M.*] has presented to the Library a copy of his monograph on Michelangelo—*Michelagnolo als Architekt* (la. fo. F. Bruckmann, Munich, 1904). Some account of the scope and aims of this magnificent work is given in the following interesting letter which accompanied the gift:—

Baden Baden, 2nd July 1904.

DEAR MR. PRESIDENT,—Will you kindly allow me to send you a copy of my new book on *Michelangelo as Architect*, with the request to offer it as a homage of sympathy and sincerest esteem to the Royal Institute of British Architects?

It is a *tirage à part* of the monograph of Michelangelo in the *Architektur der Renaissance in Toscana*, published at Munich, which will be finished under my direction in about a year. I am sorry not to be able to make a present of the whole work. As the single copy, however, costs above £100, I am only in possession of the copy the publisher gives me for my personal use.

This monograph was "born" under very unfavourable circumstances. The publisher had given up the idea of adding Michelangelo to this publication, since his most celebrated works do not belong to Tuscany. I finally succeeded in changing this resolution. But only two plates for engravings on copper were left, so I had to use photography and phototypes for all the others.

Nevertheless I venture to hope that this book will be of some interest. Though the illustrations concern only the monuments in Tuscany, yet I was able to devote a critical study to each of the Roman works of Michelangelo.

As the details are generally given to the scale of

one-fifth, the character of his mouldings may be more distinctly visible than in previous publications.

I have given facsimiles of as many original drawings of Michelangelo, or of ancient copies by the Sangallos of lost originals, as I could find. I think it may be the first time that the original studies of Michelangelo preserved in the Print Room of the British Museum, and a part of those at the Galleria Buonarroti at Florence, concerning these monuments, are published and grouped together so as to give considerable new and authentic information. Thus it became possible to illustrate, in a clearer way than hitherto, his intentions, sketches, designs, and models for the never-executed façade of San Lorenzo at Florence.

It became likewise possible to show the genesis of the Medicean Tombs at Florence, and of parts of the Libreria Laurenziana and its staircase.

I believe I was also able to point out the error of two opinions, frequently met with amongst French architects since the time of Le Tarouilly and my distinguished *confrère*, M. Charles Garnier. They both believed that the profiles and mouldings of Michelangelo's best Roman buildings were too good to be his own—that they must have been drawn for execution by Vignola or Giacomo della Porta. It will suffice to look at the profiles of his Florentine buildings to see that they differ from all those of other architects there, and are the result of a personal will, taste, and determination to make exactly "what was made." And when one compares these with the profiles of his Roman monuments, the family ties between both show that they came out of the same mind, out of the *mano che obbedisce all' intelletto*, as Michelangelo said, as those of Florence. The second error of the above-named architects which I was able to show forth by new proofs is the theory that the actual sky-line of St. Peter's cupola is not the one intended by Michelangelo, but a higher one by Giacomo della Porta.

One of the most curious peculiarities of Michelangelo's architecture I met with is the simultaneous use of three different "styles" in the same monument. In the new sacristy of San Lorenzo at Florence he adopts the Classical style for the organic members of the stone architecture, the Barocco style for the marble doors and niches, and an intermediate style for the architecture of the tombs. At St. Peter's at Rome his dome is of classical order and beauty; the interiors of the apses show forms for which the words "dreadful vulgarity," applied somewhere by Fergusson to some work of Michelangelo, are not too strong. And, again, the exterior part of these apses shows forms of an intermediate character.

I have endeavoured to find out who were the masters of Michelangelo in architecture, but with no clear result. However, I was led to the conclusion that the architect who exercised the greatest influence on Michelangelo was precisely the one

of whom this would have been least expected—Bramante—not only on account of the different ideals of the two masters, which seem to proceed from opposite poles, but because Bramante has always been represented as “the enemy of Michelangelo.” From generation to generation people repeat the harsh words of the latter for Bramante. They forget that for no other artist had he ever such beautiful praise as when he called Bramante’s design for St. Peter’s “the truth.”

By studying his sonnets and letters, I have tried to penetrate the sources whence proceed the aims of his art, so rich in contradictions—now carrying us up into the regions of superhuman grandeur, now full of incomprehensible deficiencies. The reasons for such manifestations are found in the contradictions of his natural disposition, and in the continual battle raging between these at the bottom of his own heart. Some lie in the double “mission” peculiar to Michelangelo, and in the difficulties of his being a “pioneer” searching for new paths for Art, and a “Defender of the artist’s liberty.”

Some of his works proclaim that even with a Michelangelo “liberty,” without respect for “eternal laws and divine reason,” becomes anarchy or ugliness in Art.

I should feel happy if, in England—the home *par excellence* of Liberty and order—some brother architect might feel inclined to control the results of my researches and “this book.”

Precisely as I feel as if I was something like a “posthumous disciple of Bramante,” I wanted to be particularly impartial and just to Michelangelo. But have I succeeded? That is the question I so much want to hear from other, more independent, minds. Therefore I send these lines to England.

I venture to hope, dear Mr. President, you may kindly excuse their length, and beg you to believe me to be—Yours very sincerely,

The President, H. VON GEYMÜLLER.
Royal Institute of British Architects.

THE STATUES OF WELLS FRONT.

THE interesting Paper on the Statues of Wells* evoked the remembrance of notes taken from time to time while studying drapery and costume in Greek sculpture, and again ornamental work of the Romanesque period. The question of stone carving was not in mind, but incidentally came under observation, and seeing the remark made that, though archaeology was interesting, the great thing is how to profit by it practically, I venture to give these notes for what they are worth. The end of the matter is, that material is at the basis

of very much of what we call “style,” and this is a matter which interests craftsmen in every direction. Further, that the basis thus given is then modified by the desire to imitate nature.

The dominant art of the time prior to the twelfth century was that of the goldsmith. He was a very privileged person, equal in importance to the knight. Abbot Suger of St. Denis was an acknowledged goldsmith, for instance, and this art continued long after to be of great importance. Is it not natural that the *tailleur de pierre* should have been deeply influenced by what was done in the costly shrines, where figures in gold repoussé occupied the place of honour, resplendent with flashing light and rich with jewels? These figures were in repoussé, and in lines beaten out by the blunt tool; or, if in cast work, would be chiselled with lines as in the brass knockers at Lausanne and Fribourg.

This would explain why twelfth-century work is so linear and purely ornamental, while later on all this disappears and it becomes *natural*. But another reason is found in the fact that the earlier figures would be sculptured by the ornamentalist if not by the architect himself, and we know how the early ornament is based on the technique of the Gallo-Roman work or influenced by Oriental methods, so that while Gothic work is *naturalesque*, and presents foliage, &c., standing out from a mass, the earlier work is in principle a mass into which dark lines and penetrations are cut. This would be explained by the fact that the artist was for years subject to daily influence from the fields and woods close at hand, and as his technique gathered strength he would also be influenced by the people and costumes around.

Ornamental work in Greek art was also a *cutting down into a surface*. One can see it beautifully in the Erechtheion frieze in the British Museum. This cutting was done by drills—by a series of holes which were afterwards united. The black lines so made left broad light spaces between, which were afterwards slightly chiselled. And as the ornament so the drapery. One can see the drill-holes clearly in parts of the Parthenon frieze in the British Museum, while the lines are everywhere. Even in the large figures of the pediments in the drapery of the Graces one can see these drill-hole lines, although here the art is so consummate one need never think of this being the case.

This principle was first observed while studying the Greek costume in the Louvre, and then found to be very general.

The practical conclusion suggested is this, that the charm of the early figure sculpture lies in the sincerity in which the suggestions of material are recognised, and its harmony with the ornament of which it forms part. Later on it becomes more natural, but for long is still ornamental at basis.

But modern sculpture seems to start from

* “The Statues of Wells, with Some Contemporary Foreign Examples.” By Edward S. Prior and Arthur Gardner. JOURNAL R.I.B.A., 23rd April 1904.

another point—that of imitation of the living figure; and this is made to blend, as well as it can be made to, with the ornament around, and however meritorious it may be *per se*, it strikes an impartial observer as being another art to that of the old work.

Neuchâtel.

CLEMENT HEATON.

ST. ANDREA, GENOA.

THE monastery and church of St. Andrea at Genoa is about to be pulled down to make way for a new post-office. The monastery, which belonged to the Benedictine Order, is believed to have been one of the first, if not the oldest, founded in Genoa, dating from about 970. By a decree of February 1294, the dormitory and refectory having become ruinous, were ordered to be rebuilt. These buildings are no longer in existence, the present buildings only dating from the sixteenth century. The monastery underwent considerable alterations and additions from time to time, in consequence of the establishment there of other religious orders, notably of that of San Defendente.

In 1799 the monastery was conveyed to a religious order called the Scolopi Fathers, who opened a school; but this school did not last long. The French Government, to which Italy was at that time subject, requiring a military prison, requisitioned it for that purpose by a decree dated 31st November 1810. The necessary alterations to the monastery were carried out by the architect Giovanni Bellepiane, and were not completed at the time of the fall of Napoleon. In consequence of this event, and the deliberations of the Congress of Vienna, the works were for a time suspended, but were finally completed, in the form approved, under the French Empire.

The church has a nave and two aisles with apses at the eastern end, the form of the latter not being known, the existing buildings having been erected since 1500. The only mediæval remains are the lateral arches of the nave near the apse, which are semicircular, with concentric counter-arches. Externally there are some decorative arcadings, also semicircular, with slight projection, which are partly concealed by more recent work.

The church was divided horizontally into two portions about the year 1400, according to Professor Campora, in order to construct a nuns' choir. It is not quite certain whether the lower columns of the choir are ancient or not; the columns supporting the roof are Renaissance in character. The church contains a fresco by Domenico Piola, which is in process of being removed, and will be preserved in some suitable position.

The cloisters are, however, by far the most interesting part of the building: they cover an area of about 60 feet by 52 feet, and have coupled columns

with pointed arches. The arcade and the attic are of native stone, the columns and capitals are of white marble. Some of the capitals are rudely carved with figures of men and animals grotesquely interlaced, while others have simple foliage in the style of the twelfth century. The cloister, being scheduled as a national monument, will be taken down and re-erected. A portion of the Genoese Press favour its being transported to the church of Santo Stefano, but the architect, Professor Campora, proposes the Palazzo Bianco. Many persons in this country would prefer that it should be retained in its present position, as its interest as an historical building would be almost wholly destroyed by its removal.

JOHN HEBB.

PLENUM VENTILATION AND THE ROYAL VICTORIA HOSPITAL, BELFAST.

Mr. GEORGE H. BIBBY sends the following communication, dated 14th July:—

In the JOURNAL of the R.I.B.A. for 25th June last the architects and engineers of the above hospital dispute the accuracy of certain figures given by me respecting the enormous amount of coal required in this hospital, and otherwise attempt to discredit my statements.

The present number of available beds for patients in the new hospital is only 190, the remainder being closed owing to the financial condition of the institution. There were, in the old hospital, 196 beds for patients, as may be seen from the published report of the hospital dated 31st December 1902.

The architects and engineers of this new hospital have admitted that about 1,800 tons of coal will probably be required for one year's consumption for the benefit of the 190 patients for whom beds are at present available. But they have also admitted that only 516 tons of coal were required for the old hospital, which contained 196 available beds for patients, exclusive entirely of those for other residents.

Thus 1,300 additional tons of coal will have to be paid for by the subscribers and benefactors of this institution, and the value of the coal, at Belfast prices, would be enough to provide for opening twenty of the beds at present closed by reason of the poverty of the hospital!—at £47. 17s. 8d. per bed, as in the old hospital.

Therefore, while 2½ tons of coal per patient were enough in the old hospital, the present expenditure, under the requirements of the Plenum system, is at the rate of more than 9 tons per patient. Even if the 1,800 tons could be made to answer for the full number of about 300 patients, the cost would not be less than at the rate of 6 tons per patient per annum.

In giving these figures I have assumed that the estimates of the architects and engineers, at 1,800 tons per annum, may be found correct; but there is nothing before me to show that these figures will be anything like sufficient, or that they are or will be justified by the work done, or to be accomplished, if the hospital should become full of patients.

It has not been shown that the enormous increase in the consumption of coal from $2\frac{1}{2}$ tons to over 9 tons per patient per annum can be satisfactorily accounted for by an increased hot-water supply, or other benefits to the institution. In any case, the great cost of Plenum ventilation altogether unfits it for use in a hospital so poverty-stricken as to be obliged to close one-third of its beds to patients, and it appears highly improbable that it will ever supersede the more reliable and less costly methods of natural ventilation so successfully adopted in other hospitals.

I made no remarks respecting the general health of the hospital staff, and was perfectly aware that the officials reside in apartments ventilated by other than Plenum methods, and am not surprised, therefore, to learn that they are in excellent health. I merely stated that a medical official attending the hospital had complained that he always suffered from headache as a result of entering the Plenum-ventilated wards for the patients; a letter lies before me in support of this statement.

I ascertained, beyond all possible doubt, that certain portions of this hospital were very badly ventilated, the odours of anæsthetics, &c., passing from one ward to another by way of the corridors. This can be confirmed by the official who conducted me through the wards.

My remarks published in the JOURNAL of the R.I.B.A. on this most serious matter remain unanswered and unanswerable; at all events, Messrs. Henman and Cooper, and Lea and Son, have not, so far, attempted any excuse or explanation *re* this manifest failure of Plenum ventilation.

In December last Mr. Henman pointed out to a meeting of the R.I.B.A. that "the hospital stands comparatively high, has a pleasant outlook in every direction"; but these advantages are entirely lost to those patients who might appreciate them, as there are no windows in the wards for outlooks of any kind, pleasant or otherwise! (except in the end wards, &c.)

This defect is more observable in the small two-bedded wards. Few people in good health would care to sleep in bedrooms with only top lights; but it would be far worse and more depressing to occupy such rooms both by day and night, with blank walls on all sides, and with the knowledge that a very small breakdown of the machinery, or casual inattention of the officials, might mean partial suffocation by reason of the stoppage of the artificial air supplies.

Should any doubt remain as to the accuracy of

the statements I have made concerning this hospital, they may be verified by reference to the annual report for the hospital for the year ending 31st December 1902; but for my information as to the numbers at present accommodated, I am indebted to the Superintendent of the hospital, as also for the courtesy extended to me in my inspection of the institution, and subsequent investigations.

ALLIED SOCIETIES.

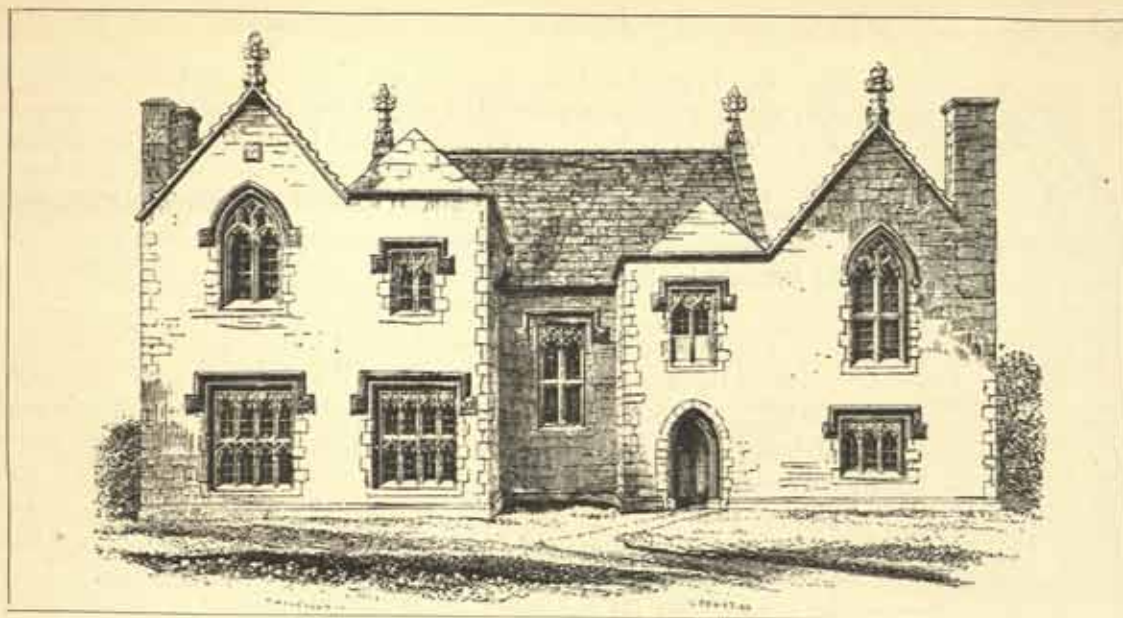
LEICESTER AND LEICESTERSHIRE SOCIETY OF ARCHITECTS.

The late Robert Johnson Goodacre, J.P.

Mr. R. J. Goodacre, who died 4th May last at the age of seventy-eight, was articled to Mr. Stephen Fry, an architect practising in New Street, Leicester; and on Mr. Fry's death he was for a time in the office of Messrs. Parsons & Dain, in St. Martin's. He commenced business by joining in partnership with a Mr. Walker, and the firm was known as Walker & Goodacre. Subsequently (about the year 1858) he set up in practice for himself at 5 Friar Lane. He was largely engaged upon work for the late Mr. Thomas Miles, land agent, and for the late Mr. N. C. Stone, land agent. Valuation both for public and private purposes occupied much of his time, and he appeared in most of the public arbitration cases connected with the town. His principal architectural works were Caldecote Hall, Warwickshire; stables, gardens, lodges, rectory, &c., at a cost of about £80,000, including several farmsteads on the estate, and the restoration of the church; Whatton Hall, Leicestershire, for Lord Crawshaw; Pickhill Hall and stables, Denbighshire; Kewick Hall and stables, Yorkshire; Skethley Hall and Nanpantan Hall, Leicestershire; Higham Grange and stables, for the Hon. E. H. Pierrepont; Brooksby Hall, Launde Abbey; Skeffington Hall, Leicestershire; and many houses in Leicester and the neighbourhood. School work engaged much of his attention, and he built and enlarged upwards of thirty schools in this and other counties, including large Board and grammar schools. His work also included restoration of many churches in this and adjoining counties, besides a large general practice in the work of the town. The late Mr. Goodacre was a Justice of the Peace for the Borough of Leicester, and was a member of the old School Board for many years, being for a time Chairman of the Building Committee. He was also one of the Governors of Alderman Newton's School and a trustee of the charity, a member of the Church Extension Board and Chairman of the Building Committee.

Leicester.

WALLER K. BEDINGFIELD.



Kingston Seymour, Somersetshire. Fifteenth Century.

ENGLISH ARCHITECTURE OF THE FIFTEENTH CENTURY.

By W. H. Wood (Newcastle-on-Tyne).

Read before the Northern Architectural Association, 10th February 1904.

THE phase of Gothic architecture which had its beginning in the latter half of the fourteenth century, reaching its full development in the fifteenth, continuing into the sixteenth, and in some places into the seventeenth century, is the culmination of the style which had been gradually evolved out of the Romanesque during the three preceding centuries.

Perpendicular work is worthy of special study for several reasons. First, there is its exclusively national character, which distinguishes it from its forerunners. Norman, Transitional, Early Gothic, and Decorated are found on the Continent, and it was not till the latter part of the fourteenth century that the development took place which gave us a style entirely our own. Although it has certain features in common with the Flamboyant of the Continent, the general effect of the two styles is very different, the English work being much more reserved.

It is very interesting to trace the first beginnings of the style. These, indeed, in some cases are very far back; as, for instance, in the east window of Evington Church, Leicester, *circa* Edward I., the characteristics of Perpendicular are shown. In the east window of Eggleston Abbey [fig. 1], dating about 1220, the mullions are carried straight up to the arch. These, however, are more what might be called anticipations; the real development is seen in the later examples of Flowing Decorated tracery. At Durham Cathedral the large window of the north transept [fig. 2] and the west window illustrate the gradual introduction of the vertical bar which later became the distinguishing mark of the style.

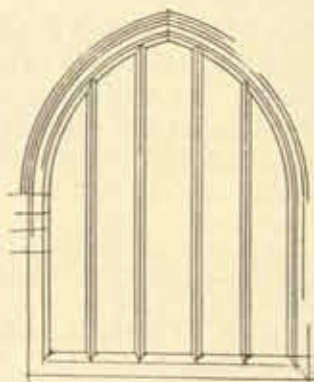


FIG. 1.
EAST WINDOW, EGGLESTON ABBEY.

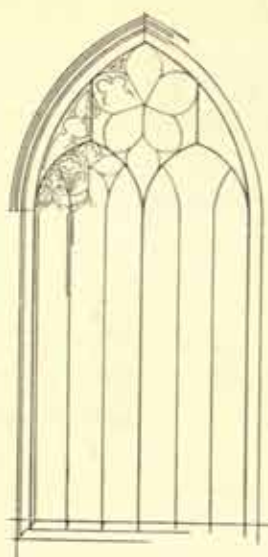


FIG. 2.—NORTH TRANSEPT,
DURHAM.

The Transition style between the Decorated and Perpendicular is a well-marked one, possessing certain features common to both, as the segmental arch and acute gablet of the Decorated, with the vertical tracery bar and low-pitched gable of the Perpendicular. The small chapel in the centre arch of the west front of Peterborough Cathedral and Merton College Chapel, Oxford, are examples; the Bishop's throne at Durham is another.

MOULDINGS.

The fully developed Perpendicular is distinguished by several characteristics peculiar to itself. First, the mouldings are no longer worked on receding orders and stopped on caps at the springing of arches, but are now worked on the chamfer plane, and in most cases only certain members rest on caps, and the others continue down the piers or jambs.

These mouldings are often of great vigour and beauty. They consist of combinations of the following members:—(1) the hollow; (2) the boutell; (3) the ogee; (4) the double ressaut or double ogee; (5) the wave; (6) the casement or wide hollow.

CAPITALS.

The upper portion of the capitals and the lower parts of the bases are always octagonal. There is great elegance about both these features; the capitals are frequently enriched with either battlements or cresting on the abacus; the bell may be either plain or foliated.

In Somerset the capital of a clustered shaft is often treated as one, a wreath of foliage running right round; but the general practice was to use capitals sparingly on shafts separated by hollows or groups of mouldings. In some cases the capitals are very small, as in the cloisters at Worcester and the chancel arcade of St. Mary's, Lowgate, Hull. In other instances they are very tall, as on the chantry of Prince Arthur in Worcester Castle and the porch of Lavenham Church.

BASES.

The bases are much higher than in the preceding style; in piers this was done to raise them above the level of the fixed seats with which churches were being furnished at this time. They usually commence with an astragal and bell, with or without other members below; and this part is generally circular, resting on an octagonal plinth, often of several stages. In piers with shafts the bases of the shafts are frequently at a different level from that of the main pier. External bases to buildings are of the same profile, but often have bands of quatrefoils or other ornament, producing a very rich effect. Sometimes the base is stepped up and carried round a door like a label.

PIERS.

Piers are often either formed of four shafts separated by four large hollows, or are octagonal; in the latter case the caps are sometimes omitted, and the arch-moulds die into the shaft, as in the cathedral; an arrangement which Professor Willis rather unhappily terms the "discontinuous impost." Piers are often mullion-shaped, the long axis being north and south, and consist of shafts and groups of mouldings. They are sometimes arranged with the minor axis not in the centre of the major axis. Piers are sometimes panelled, the panels generally being continued into the arch without a cap. This, on a large scale, produces a remarkably fine effect, as at Sherborne Minster.

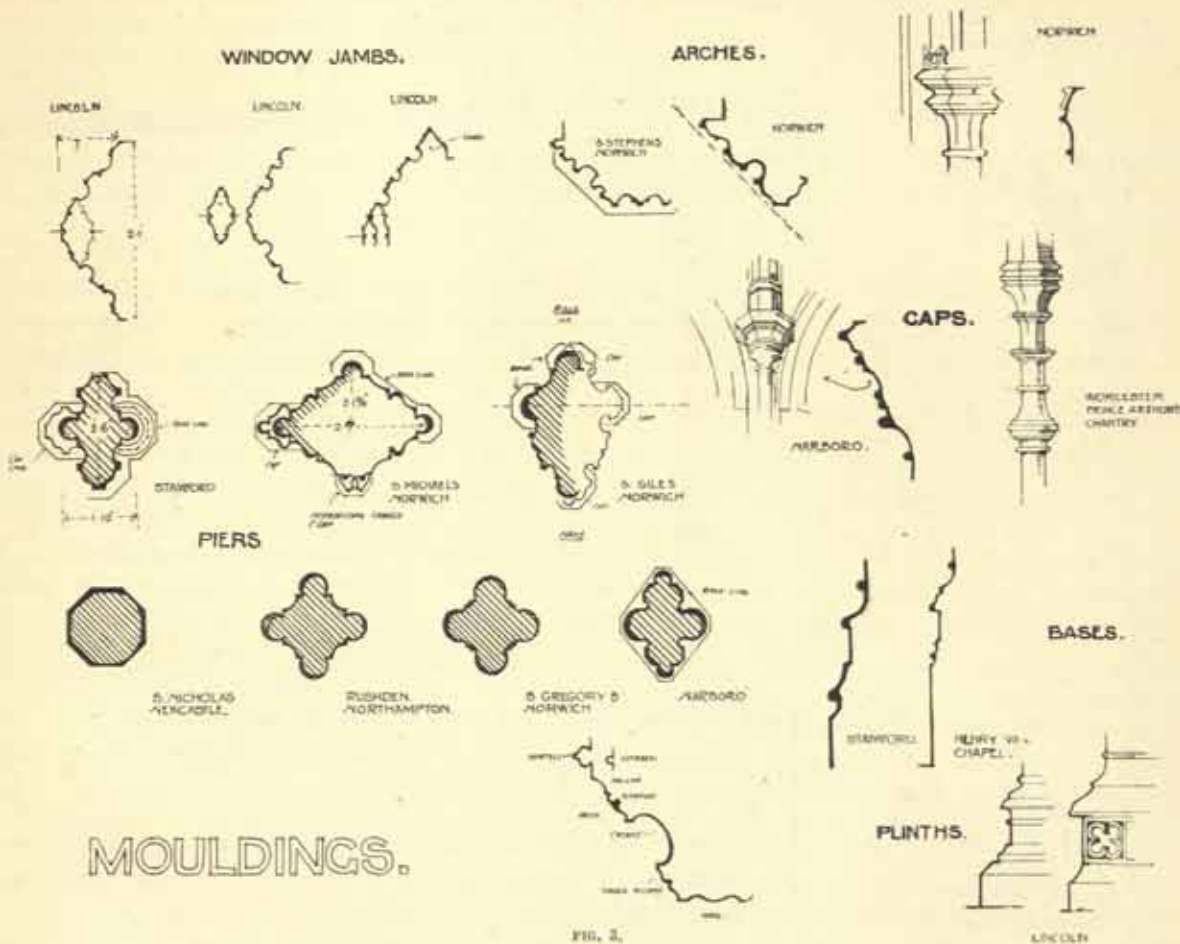


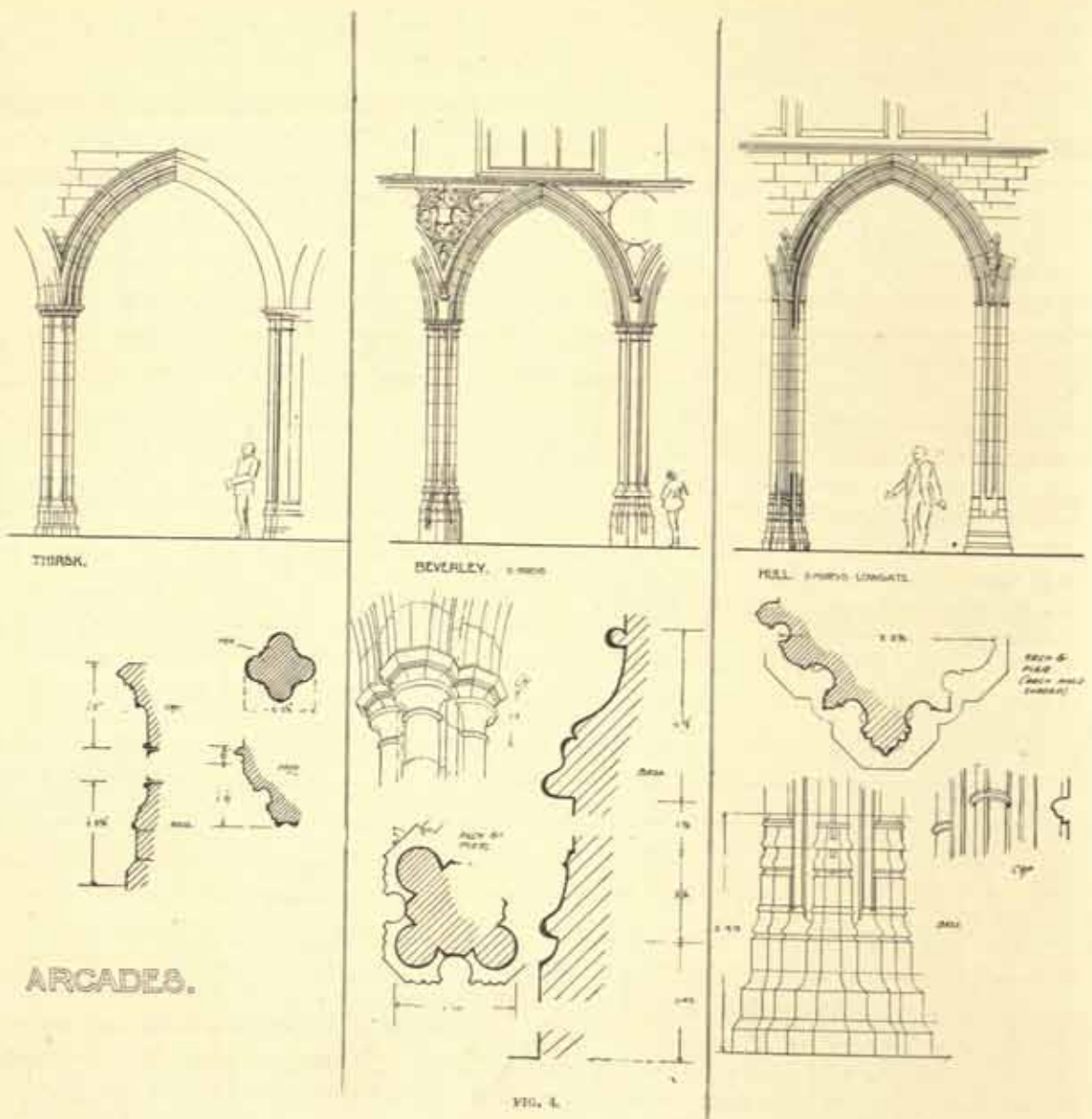
FIG. 2.

ARCHES.

One of the most marked changes was in the introduction of the four-centred arch: an immense improvement upon the segmental round or segmental pointed. They are generally used first in doors and windows, and only late in the style for pier arches. Four-centred arches vary a good deal in shape, depending upon the relative position of the centres for the large and small curves. The pier arches at Winchester are only apparently four-centred, being really three-centred, the lower curves being struck from one centre: a form suggested by the arches of the Norman building, which was being then transformed into a Perpendicular one. The general rule for four-centred arches is to divide the space into four equal parts, striking the small curves with one part as radius, though these centres produce lines down below the springing to a distance equal to the space, and from these points strike the large curves.

DOORWAYS.

Doorways have commonly four-centred arches with a square label over them, instead of a hood-mould, the spandrels being filled in with tracery or carving, coats-of-arms being often introduced. Some examples are of great beauty and richness. Where a hood-mould is used,



following the line of the arch, it is sometimes carried up in an ogee outline and terminated in a finial or niche; or it may be carried up as a straight-sided gable, as in the magnificent north porch of Beverley Minster. Doorways in this style are sometimes wonderfully rich with carving and niches, now, alas! generally empty. The west doorway of Bridlington is a fine example. The doors themselves are often covered with the most elaborate tracery, as at Thirsk, St. Albans Abbey, &c.

WINDOWS.

But it is in the windows that the leading characteristic of verticality is most manifest. The mullions no longer stop at the springing of the arch, but run on until stopped by the arch

itself. The variations of Perpendicular tracery are innumerable, and the possible combinations endless. A few of the principal types may be described. There is, first, the simple, where the mullions run straight up and the head is subdivided into "batement" lights by other vertical bars. Secondly, the compound, where the window is divided by arched bars into smaller windows. Some compound windows are of enormous size, as the east window of York and the east window of Gloucester. Thirdly, the transomed, where the lights are crossed by transoms, either plain, embattled, or with cresting, with or without tracery below, and crossing either in a straight line or at different levels. They are frequently introduced in the tracery itself. The most beautiful form is the traceried transom, often with inverted cusped arches.

Transoms give great strength to the mullions, and in very large windows are a necessity unless buttressed mullions are used or double tracery; even in this case they often occur,

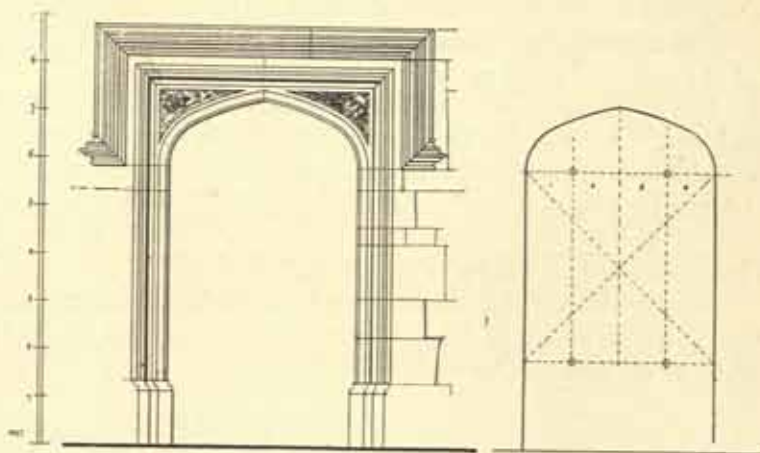


FIG. 5.—DOORWAY, CHRIST CHURCH, OXFORD.

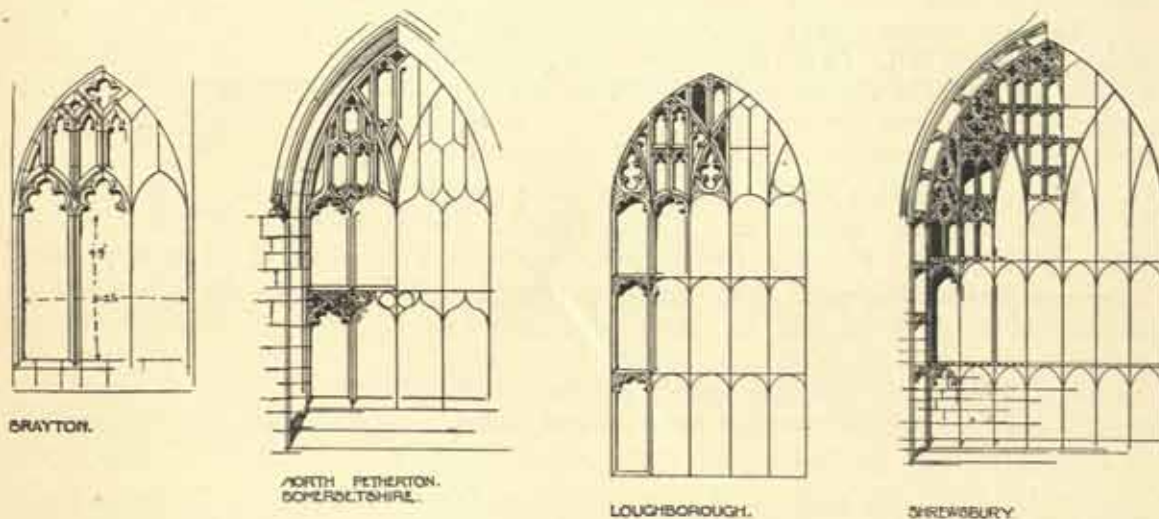


FIG. 6.—WINDOW TRACERY.

being then richly vaulted underneath, as in the east transepts of York, and forming a pathway connecting the triforia, as in the north transept window at Durham. In many cases, especially where four-centred arches are used, the tracery commences below the springing line with the most happy effect. Often the traceries of the different lights begin at varying levels, the centre light being kept high to give more room for the principal subject in the painted glass.

I have referred to buttressed mullions: these are used occasionally in very large windows to strengthen the principal mullions, as in the west window of Gloucester. Sometimes statues in canopied mitres occur on the mullions, as in the west windows of the aisles of Bath Abbey.

The square-headed window was a great favourite both in ecclesiastical and domestic work, and is capable of great variety of treatment.

The wide-mullioned windows of houses and other buildings of this period are often of great size. Another feature of special beauty is the oriel and bay window. These are often most elaborately panelled, with enriched cornices and panelled or pierced parapets. There is no doubt that the square-headed mullioned window is a most satisfactory feature both from a practical and from an æsthetic point of view; this is shown by the persistency with which it has continued in use up to the present time.

One peculiarity of Perpendicular windows worth mention is that in many cases the glass plane is in the centre of the wall, and the section of the jamb and arch is the same inside and out, as at St. George's Chapel, Windsor.

PANELLING.

With regard to the enrichment of buildings of this period we find that wall arcading and diapering have been superseded by panelling: a system of decoration which we find carried out in the most complete manner in Henry VII.'s Chapel at Westminster. Panelling is often of the most surprising delicacy and richness, at other times displaying strength and vigour. There is nothing that gives such an effect of loftiness as these strong vertical lines of wall panelling, as we find it used in the most elaborate buildings, giving an effect of dignity and richness not to be obtained by any other method. Sir Charles Barry was well aware of this fact when he designed his great masterpiece, the Houses of Parliament.

In some buildings the windows are merely formed by piercing portions of the panelling which covers the wall. In the flint districts the panelling is formed of freestone mullions and tracery, not moulded, and filled in flush with dressed flints, as at Southwold.

VAULTING.

It is in the vaulting that we find the crowning glory of the style. With the beginning of the new style there appears the fan vault, a system entirely different constructionally from the vaulting previously in use. Hitherto, after the Norman period, vaulting had been formed by arches dividing the space to be covered into compartments and supporting a thin shell of stone; but in fan vaulting, in its simple form, constructional arches are dispensed with; a conoid of stone of uniform thickness springs from the vaulting shaft, and the surface of the conoid is decorated by radiating tracery ribs intersected by horizontal bands of tracery—a form of decoration at once the most beautiful and logical, a vaulting shaft, with its spreading ribs rising from it, rivalling the grace of the palm tree with its spreading fronds. The spaces between the conoids, or, more correctly, between the uppermost horizontal bands, are either decorated with tracery or pendants, which latter give the most surprising grace to the vault. These merely ornamental pendants are not to be confused with the constructional pendants which really carry a portion of the vaulting, as in the roof of the Old Divinity Schools at Oxford and that of Henry VII.'s Chapel. This latter is perhaps the most beautiful roof which the genius and skill of man has ever erected—indeed, the chapel as a whole is one of the most beautiful edifices in the world. In this roof, the construction of which I show [fig. 7], there are strong arches dividing the vaulting into oblong bays: one voussoir on each side is prolonged, ending in a pendant from which a conoid springs and meets the conoid springing from the wall, thus avoiding the awkwardness which otherwise occurs in an oblong bay by the

conoids meeting so much sooner in one direction than in the other, as at King's College Chapel, Cambridge [fig. 7]. The earliest example of fan vaulting is in the splendid cloisters at Gloucester.

Fan vaulting is an exclusively English invention, there being no examples outside this kingdom, and is one of which we may justly be proud. In it we have the perfection of the stone roof, which had all through the Middle Ages been regarded as the most dignified way of covering a building. The stone roof gave a unity and completeness not obtainable by a wooden roof, and in later Gothic buildings the arrangement of the vault gave the key to the plan, the points of support and resistance all being arranged to suit it.

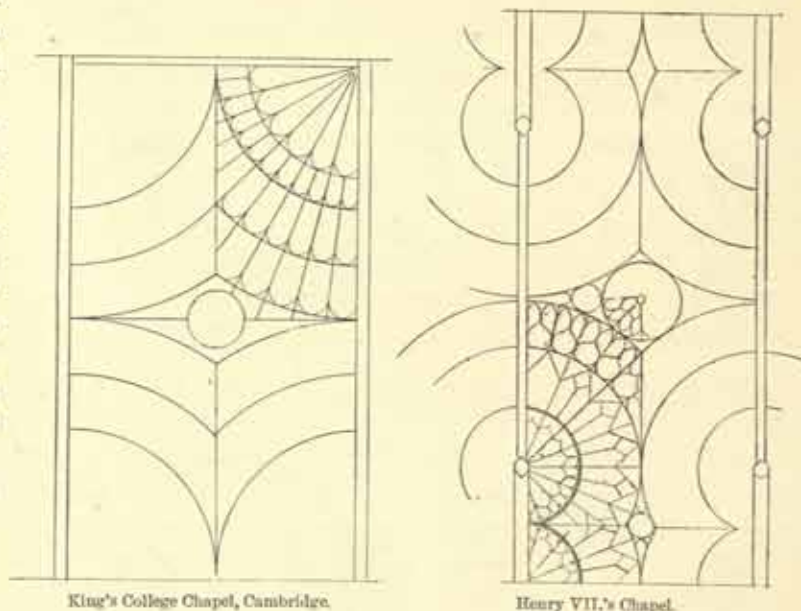


FIG. 7.—DIAGRAMS OF VAULTING.

WOOD ROOFS.

Wooden roofs were used for the great majority of buildings, and are of several types :

(1) The hammer-beam ; a form capable of the most elaborate treatment. In this system the tie-beam is cut away, a collar holding the principals together at the top, and these being prevented from spreading by bending by the increased depth given by the braces below. These roofs depend to a great extent for their stability on the oak pins, and in many cases where these have given way the roof has spread and pushed the walls out of plumb. The ends of the hammer-beams are frequently decorated with angels with outspread wings, as in some of the grand Norfolk churches.

(2) The arched principal roof, the Westminster Hall example being the most elaborate. In principle this is similar to No. 1.

(3) The wagon roof, in which the construction of framed rafters is concealed by a wood or plaster ceiling in either arched or canted form and decorated by moulded ribs often with carved bosses at the intersections.

(4) The tie-beam roof, usually of low pitch and with considerable camber given to the sturdy tie-beam, which is assisted by curved wall struts. The tie-beam carries vertical struts which support the principals, the spaces between the struts being often enriched by tracery. The details of this kind of roof are often very beautiful, and they are very sound constructionally, exerting no thrust and forming a very effective tie across the building.

ROOF PITCH.

The pitch of the roof was lower than was generally the case in earlier work, and was usually concealed by a parapet often richly ornamented. In the battlements it is usual for the coping to mitre round the merlons, instead of being cut off square ; this has a much better

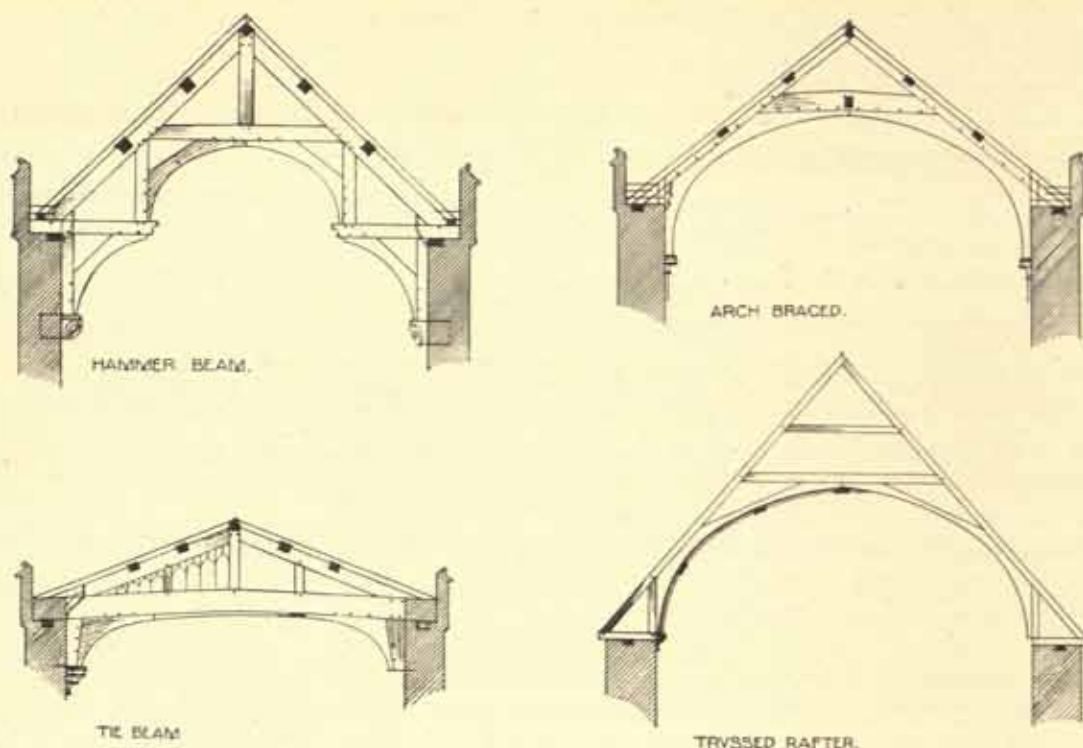


FIG. 8.—ROOFS.

effect. There is a sturdiness and gravity about the low-pitched gable which has a charm of its own, and harmonises with the four-centred window so often accompanying it; while the studied outlines of the buttresses, with their offsets arranged to give a somewhat parabolic outline, complete the effect of stability.

BUTTRESSES.

Buttresses may stop below the parapet, or have pinnacles standing above, or end with flat-topped caps to receive figures, as at the Beauchamp Chapel, Warwick; St. George's Chapel, Windsor; and the Lady Chapel at Peterborough, where the statues still remain. The slopes are frequently curved and the general outline curved, as in the magnificent buttresses added to support the Galilee Chapel at Durham. Buttresses, like other features, are often panelled, as at Lavenham, and frequently have niches for statues. Sometimes octagonal turrets are used in lieu of buttresses, as in the tower of St. John's, at Newcastle, and the cathedral, and at Henry VII.'s Chapel, where they terminate in cupolas. As the style advances these cupolas become more frequent and of larger size, and we must not overlook the fact that these, though only used as the terminations of turrets, are really domes invented quite independently of Classic tradition or Renaissance influence.

CHURCH PLANNING.

In the churches of the fifteenth century there is a distinctly different effect from those of earlier periods. The cruciform plan is now abandoned in favour of the parallelogram, and the structural division between nave and chancel is often omitted, the arcade and clerestory being continuous, and the ritual separation of the chancel being obtained by a screen and the frequently increased richness of the roof of the sanctuary.

CLERESTORIES.

These continuous clerestories, of which there are such noble examples in the churches of Norfolk, give a lightness in complete contrast to the comparative darkness of the upper part of early churches only lighted by small and unimportant windows, as at Warmington. So beautiful were they felt to be that the majority of early churches had clerestories added in the fifteenth century. The aisle windows are now of greatly increased size, and occupy in many cases the entire space between the buttresses, which have to be increased in projection to give compensating strength. The buildings were now constructed on more scientific principles, and the arrangement of supports and the equilibrium of the structure more carefully considered, the necessary counterpoise to the thrust of the vault or roof being given in the most economical way without the use of vast masses of solid wall. In fact, the wall has become merely a filling, the piers, arches, and buttresses forming the skeleton of the structure.

TOWERS.

The towers of this century are without doubt the most beautiful of any period, those of Somerset being generally admitted to be the finest, the most admirable proportion and carefully studied outline being combined with exquisite detail. Among the finest is Taunton.

The great charm of these towers is in the arrangement of the buttress offsets so as to give an effect of entasis as well as of diminution, and this outline is obtained from every point of view. There is no doubt that these towers were drawn on the diagonal as well as front elevations, and not merely the latter, as is the practice of the modern architect, and so often with such very unhappy results. Fifteenth-century towers rarely have a vertical outline unless they have polygonal angle turrets, as at Sedgefield; the Magdalen tower, Oxford; and St. John's, Newcastle.

In cases where for economical reasons buttresses were dispensed with the towers diminish by offsets at the successive stories in a way at once simple and effective, as at St. Margaret's, Durham. The difference of effect produced by this curved tapering and the vertical outline of the earlier towers is well seen at Durham by comparing the outline of the fifteenth-century central tower with the Norman transitional western ones. These latter towers, by the way, owe a good deal of their effect to the imitation Perpendicular parapet and pinnacles with which they are now finished.

The octagonal lantern was an early feature that survived, and was treated with great success, as at Boston, All Saints Pavement, York; and Coventry.

The great majority of towers of this date are flat-topped and terminated by a parapet which in plain examples is finished with a simple battlement. In more ornate work this

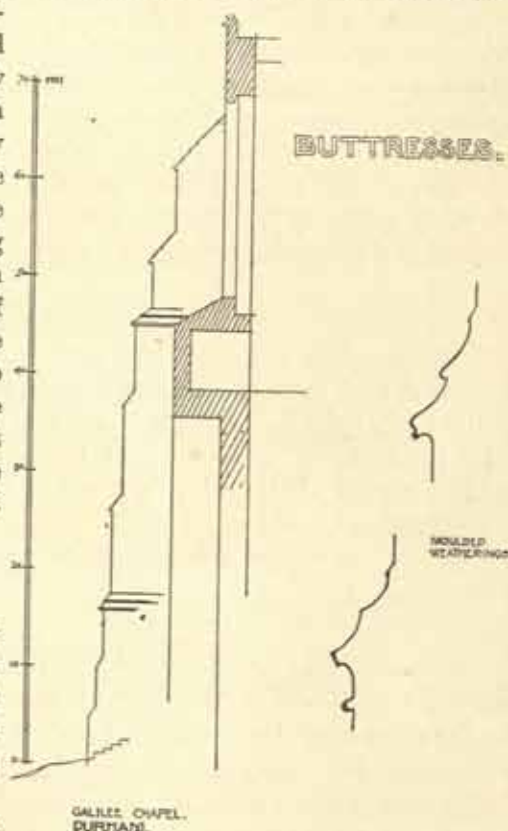


FIG. 8.

parapet is ornamented with surface panelling, or it may be pierced, and usually has pinnacles at the angles. In many cases there are one or more intermediate pinnacles on the faces of the tower, and in elaborate specimens, as Taunton, the whole arrangement of parapet and pinnacles forms a glorious crown to the edifice. This example has hanging flying buttresses springing from gargoyles on the main cornice and supporting the great angle pinnacles. The angle pinnacles are generally admirably proportioned with regard to the tower, and, as at Gloucester and Canterbury, are of most elegant outline. They may be placed either as the upward continuation of the angle buttresses, or may stand on the cornice without any connection with the buttresses below, as at York.

The general effect of these towers is most satisfying, and, however beautiful the spire of the early ones may be, there is a stately dignity about the square tower, with its coronet of parapet and pinnacles, which more than compensates for the loss of height.

SPIRES.

When spires are used they are well proportioned, the broach of earlier days being discarded, and the spire now rising from behind a parapet. The entasis formerly used is omitted, the spire lights either omitted or much reduced in size, and the relative height of the spire to the tower increased. At Hemingbrough, in Yorkshire, the spire is twice the height of the tower, the latter being 60 feet, and the total height of tower and spire 180 feet. This is a charming example.

Polygonal towers are sometimes used. There is an hexagonal one at Cotswold, in Yorkshire.

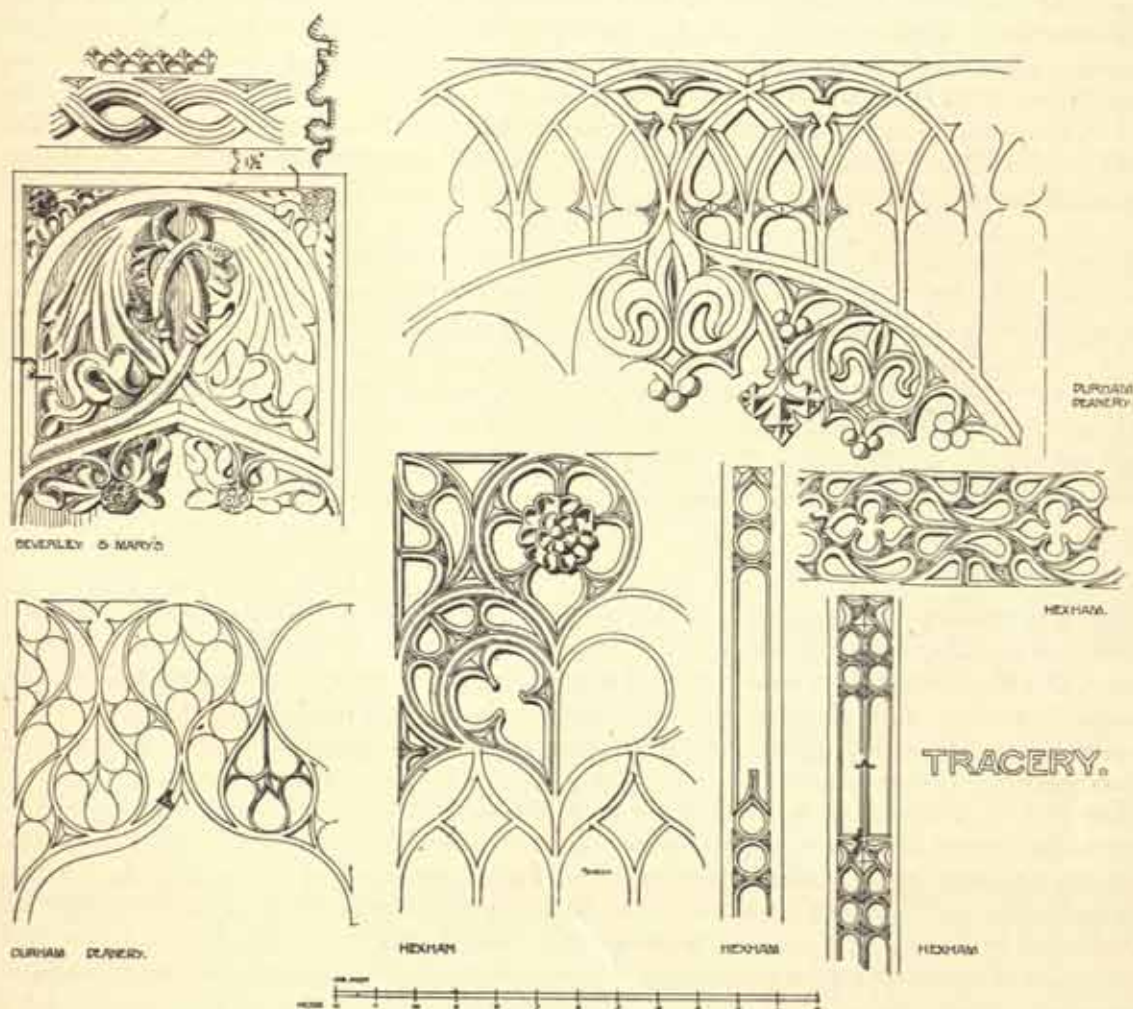
WOODWORK.

The woodwork of this style is not the least of its beauties. We have comparatively little woodwork earlier than the end of the fourteenth century, but after that time we find innumerable examples of beautiful work in screens, pulpits, lecterns, font-covers, stalls, bench-ends, doors, &c. Many of the screens are of great magnificence, and in spite of the unfortunate destruction of many there are still a great number left. Oak was the material used, and it was nearly always decorated with colour and gilding. In many cases this is still remarkably fresh, and in most examples traces of it can be detected.

The principal feature in the interior of a church at this date was the rood screen stretching across the entrance to the chancel, and often continued across the side aisles. The lower part is solid to about 3 feet high, with panels often with paintings of saints or the nine choirs of angels. Above this are mullions with tracery, and a bold cornice usually carried on fan or other vaulting, and consisting of one or more bands of carving surmounted by a cresting. There is a splendid example in Aysgarth Church, in Wensleydale, brought from Jervaulx Abbey. Upon the screen stood the rood, a crucifix, with attendant figures of St. Mary and St. John. It is improper to use these figures when there is none on the cross, as in our cathedral, as St. Mary and St. John left before the body was taken down, and did not stand gazing at the empty cross. Often there was a panelled parapet on the boldly canopied top of the screen, forming the rood loft in which a concealed choir or a small organ was sometimes placed. The expression a "pair" of organs used by old writers does not mean two instruments, but is used as some people use the term when they speak of a step-ladder as a pair of steps. The screen at Hexham Abbey is a fine example of one with loft. The access to the lofts was by winding stairs in one or both piers of the chancel arch, or in turrets built specially for the purpose. The traces of these stairs and doors can often be seen, as at the cathedral of St. Andrews. In addition to the rood screen there were others at the side of the chancel

separating it from the aisles, besides screens forming enclosures to altars in other parts of the church.

In cathedrals there were numerous altars with their enclosing screens. Screens were also used to enclose chantry chapels. There is a good example at Hexham in the screen to the Ogle shrine. There are traces in all old churches showing where the head beams of the



screens were let into walls and pillars. This is very noticeable at Durham in the chapels of the transepts.

One of the great mistakes made by our early restorers was the removal of screens in order to obtain a vista. A vista is still looked upon by many people as the great thing to strive after. They fail to appreciate the element of mystery which accompanies partial concealment and the pleasure of discovering new beauties and objects of interest by degrees, instead of having everything staringly visible. Can anything be more charming than the eastern portion of Westminster Abbey, with the chapels screened off from the aisle, and the way new beauties unfold themselves as one walks round towards the entrance to Henry VII.'s Chapel?

There is perhaps no place which possesses the charm of mystery in such degree, or gives one a better idea of what a great church of the Middle Ages was like.

One peculiarity of Perpendicular woodwork should be pointed out—viz. that as the style matured the tracery became more flowing and more varied. In much of it there is not a rectangular feature.

There is a very beautiful piece of work in Brancepeth Church, near Durham, fixed above the chancel arch, and supposed to have come from Durham Cathedral. It is a coved canopy divided into thirty-nine panels by moulded ribs with carved bosses at the intersections and each panel filled in with tracery of a different design. This work is oak and not ivory, as often asserted. There is some beautiful panelling round the hall of the Deanery at Durham with varied tracery of more or less flowing type. Tracery formed solely by intersecting arches is not uncommon.

Beautiful work is found in bench-ends and stalls, of which magnificent examples exist at Ripon, Chester, &c. Those in Henry VII.'s Chapel are particularly fine. The canopies which surmount the stalls are all on much the same general plan, consisting of diminishing polygonal stages finishing with a crocketed spire. Those at Durham, though of Renaissance work, are an imitation of the earlier ones, and are of very good outline, but the detail is poor. There are some very fine carved bench-ends in the chapel of the Castle at Durham, and two, evidently by the same hand, at Wensley Church. Bench-ends are in old work nearly always got out of thick stuff, so as to get plenty of depth for the tracery and carving, and to this they owe a great deal of their success.

IMITATIONS.

The architects of the fifteenth century appear to have had great respect for the work of their predecessors, and often adapted their work to it. The nave of Westminster Abbey is a well-known example where the design and proportions of the Early English choir are faithfully kept, and the difference of date can only be detected by the mouldings, showing that they considered their own sections superior—an opinion I think many will share. In this example the Early English wall arcade is faithfully copied, although this form of decoration had been superseded by panelling. At Hemingbrough the arcade on the south side of the chancel is an imitation of Early English, even to the characteristic three-lobed leaves in the caps: this is early-sixteenth-century work.

At Durham, in the Galilee Chapel, the coupled marble columns of the transitional Norman period have been carefully copied in freestone by the fifteenth-century architect; while at Pickering, in Yorkshire, is an example of fifteenth-century Norman. Thus we see that the imitation of earlier styles did not originate with the architects of the eighteenth and nineteenth centuries, as is generally supposed, and for which practice they are so often condemned; indeed, in slavishly copying old work and misapplying it to totally different purposes from those for which it was originally used they certainly lay themselves open to condemnation. This has been done by both schools, though the classicist of the eighteenth century who tried to force the architecture of Greece into uses for which it was not adapted was more in error than his nineteenth-century successor who tried to build Early Gothic mansions. There is, however, no more reason why we should not take the fully developed Gothic of the fifteenth century, and, carrying it on a stage further, adapt it to modern requirements, than that the architecture of the Renaissance should not be used for present-day purposes. We have justification for it in its exclusively national character, while its greater lightness of design, the possibility of obtaining any area of window surface desired without losing scale, the absence of the large entablature which is so apt to lead one into bad arrangements of windows above and below,

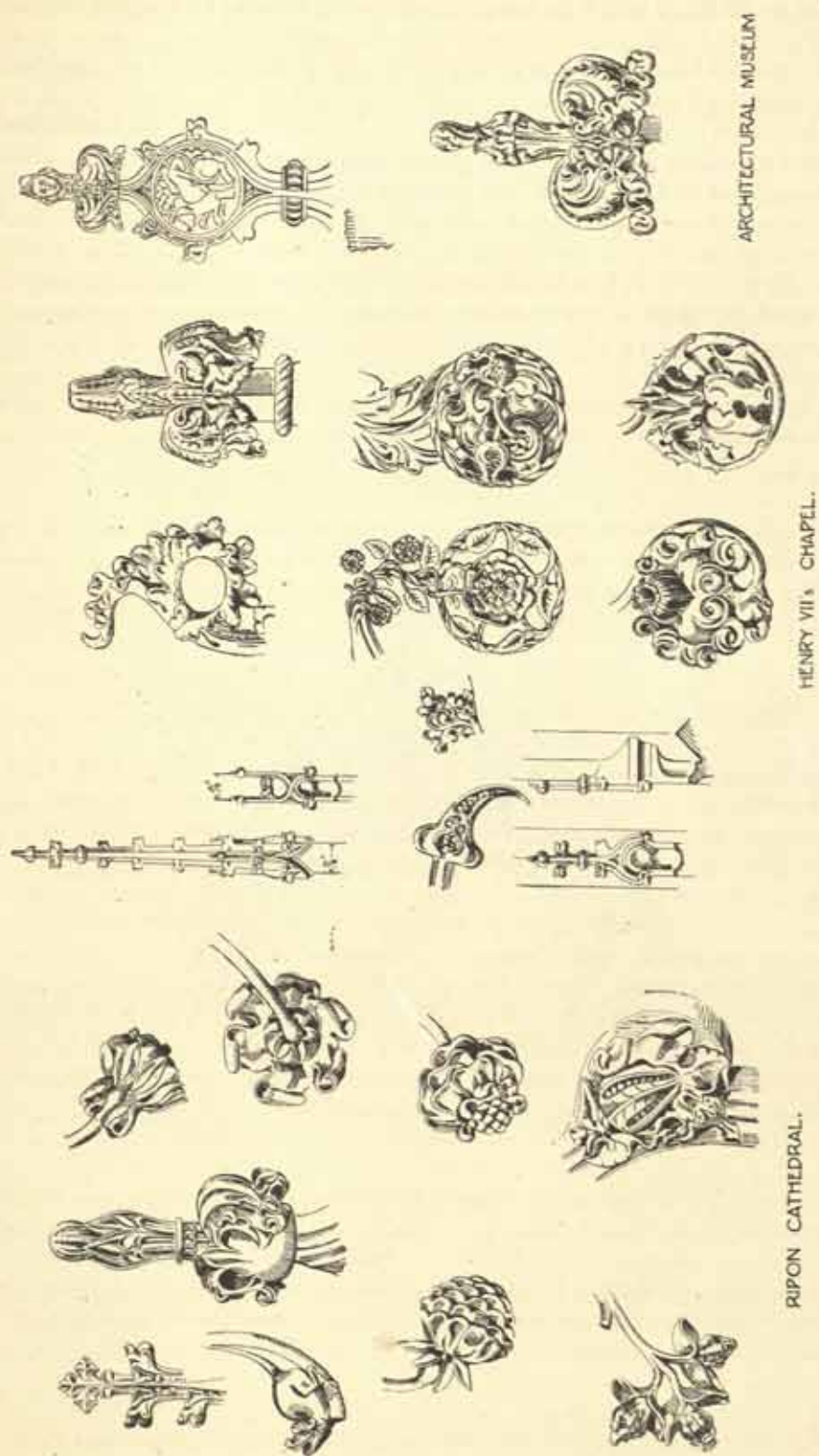
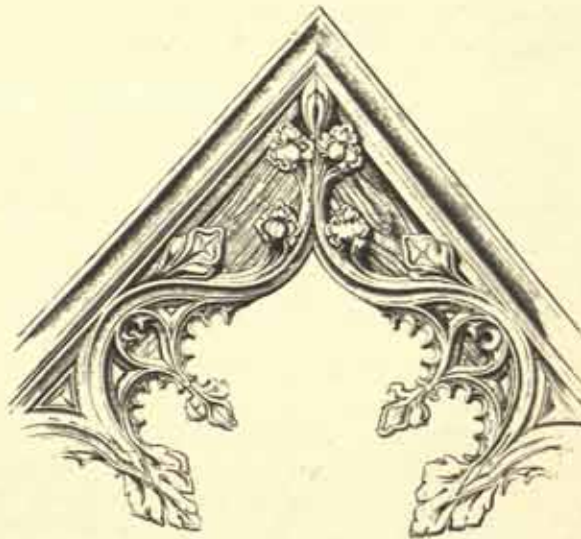
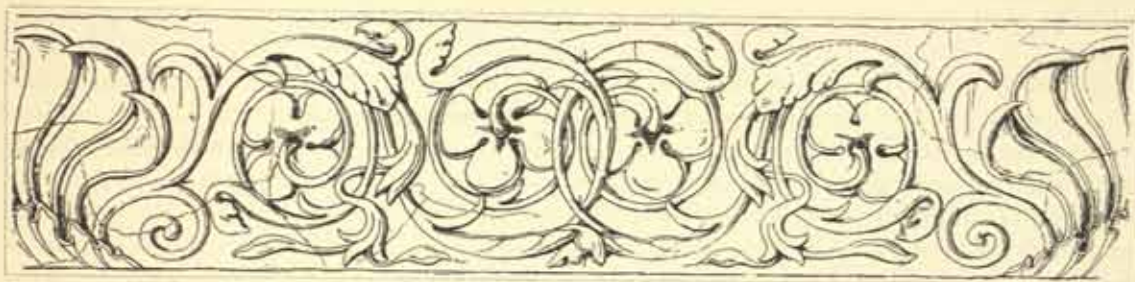


FIG. 11

and the great elasticity of the style, render it peculiarly suitable for modern business requirements.

Among the most beautiful works of this style are the chantry chapels and tombs, which are full of the most varied and beautiful details. The measuring up and drawing out of these is quite an education in Perpendicular, as they are in most cases the work of experts in their profession, and constitute perfect miracles of art. I hope that young students who have heard me will be induced to study Perpendicular work perhaps more than they have done, and make measured drawings of such examples as they may come across. I would particularly impress upon them the advisability of getting mouldings and details, full size, on the spot. In wood tracery work the nosing can often be impressed on the paper with the finger, and the cusping and details filled in by hand. It is always advisable to measure with a view to making a finished drawing afterwards; but where there is no time for this, at least one or two leading dimensions should be taken, as with a good sketch these prove very helpful; for example, in a sketch of a window carefully made and in proportion, if one is only able to get the width of a light and the breadth of a mullion, it is much more useful for reference.





NOTE SUR DEUX ÉPURES ÉGYPTIENNES CONSERVÉES À EDFOU.

By AUGUSTE CHOISY [*Hon. Corr. M.*],

ROYAL GOLD MEDALLIST 1904.

SUR la terrasse du portique de la cour du temple d'Edfou (côté Est), on distingue deux épures que nous reproduisons [figs. 1 et 2]. Ces épures—à grandeur d'exécution—sont tracées sur des dalles de grès assez rugueuses, et devaient sans nul doute disparaître sous un enduit. Gravées avant l'application de l'enduit, elles sont à peu près contemporaines du gros œuvre, ce qui autorise à les dater de l'époque ptolémaïque. L'une d'elles [fig. 1] a été publiée en 1896 dans l' "*Intermédiaire des Mathématiciens*," par M. Bouriant. L'autre [fig. 2] est, croyons-nous, inédite et semble une variante de la première. On y aperçoit, aux points marqués par la lettre *x*, des signes distinctifs bizarres : sur l'une, un pied humain ; sur l'autre, deux.

Si l'on admet que les recoupements de lignes *x* et *x'* sont des repères indiquant la position de l'axe, l'épure 1 donne une corolle à tige grêle ; l'autre, une corolle à tige épaisse. Et si l'on attribue aux deux variantes la même hauteur totale, soit 1^m 80, on obtient pour l'une la silhouette fig. 3, pour l'autre le contour fig. 4.

Que représentent ces deux tracés ? Généralement on les considère comme des études pour un profil de corniche en forme de gorge. Nous voyons à cette explication plus d'une difficulté : 1° L'indication très nette d'un socle massif, peu compatible avec l'idée d'une corniche. 2° La répétition [fig. 1] du profil en contre-partie à droite et à gauche d'un axe de symétrie. Que l'architecte ait disposé, à droite et à gauche de cet axe, deux tracés plus ou moins différents, cela peut à la rigueur se concevoir ; mais reproduire identiquement le même profil eût été un travail en pure perte. Sans nul doute l'épure 1 est celle d'une figure de révolution : nous sommes en présence d'un objet en forme de corolle, s'épanouissant au sommet d'une tige tronc-conique, et reposant sur un socle.

Le fût grêle est presque nécessairement métallique ; l'autre peut être de pierre. Quant à la matière de la corolle, l'absence de toute indication d'épaisseur donne à penser quelle était de métal. Le profil a de frappantes analogies avec celui d'une cuve découverte à Suse par M. de Morgan ; or la cuve susienne est faite de trois feuilles de métal appliquées l'une sur l'autre. Le détail de cette curieuse fabrication n'a pas, que nous sachions, encore été analysé de près : mais, à coup sûr, la technique susienne s'adapterait à la corolle d'Edfou. Ainsi il paraît fort admissible : 1° que la tige et la corolle étaient circulaires ; 2° que la corolle était de métal battu.

Quelle était la destination de cet élégant objet ? Par son aspect général il se rapproche beaucoup d'une table, d'un autel d'offrandes figuré dans la *Description de l'Égypte* (tom. ii.

pl. 90) ; c'est cette attribution qu'adopte M. Bouriant. Les objections qu'elle soulève sont la hauteur de 1^m 80, qui rendrait pénible le placement des offrandes, et le rebord en pente sur lequel ces offrandes risqueraient de glisser. Qu'il nous soit permis de risquer une autre conjecture : Le profil en coupe-larme et la structure métallique conviendraient à merveille pour une vasque de fontaine. Une photographie que nous a obligeamment communiquée M. Phéné Spiers prouve qu'il existait dans la cour du temple romain de Balbek un bassin de fontaine ; serait-il inadmissible que des fontaines eussent fait partie des dépendances des temples ptolémaïques ? Nous ne hasardons cette hypothèse que sous toute réserve ; mais l'existence à Balbek d'un bassin et, à Edfou, d'une vasque utilisable pour une fontaine sont deux faits qui méritent tout au moins d'être rapprochés.

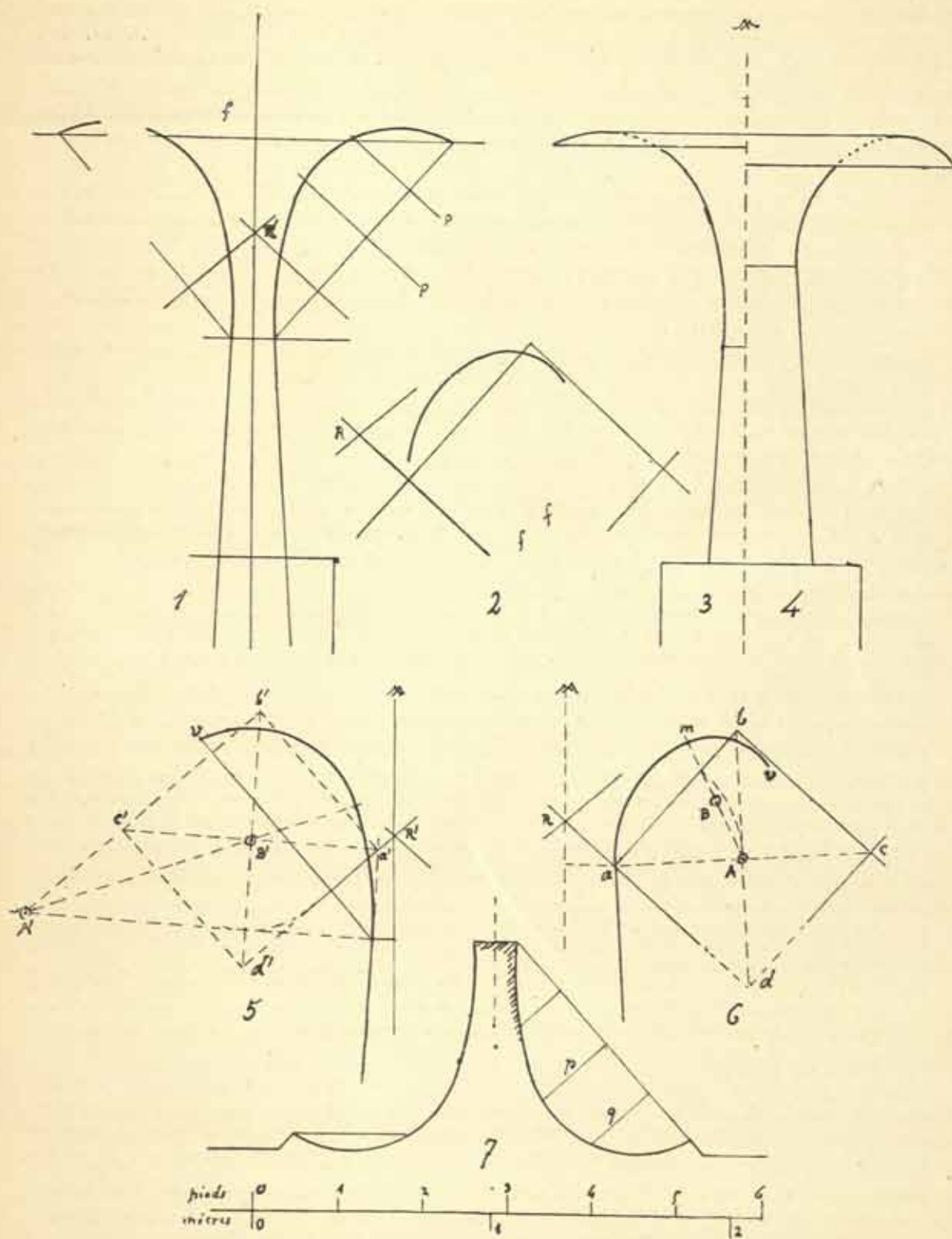
Quelle que soit la destination, les épures d'Edfou ont leur intérêt au point de vue de l'histoire des méthodes, parce qu'elles permettent de ressaisir, dans deux exemples authentiques, le caractère essentiellement géométrique des profils égyptiens. Envisageons d'abord la variante épure 2 ; nous commençons, par elle, parce qu'elle contient l'indice manifeste des données graphiques qui ont servi à l'établir. On y distingue [fig. 6] un carré $abcd$ dont le sommet a correspond à la naissance du profil en gorge. Le côté de ce carré est 0^m 75. Calculant la diagonale, on trouve 1^m 0606. Elle représente 3 fois le pied philétérien de 0^m 3555 ($0,3555 \times 3 = 1,0665$). La diagonale ac de ce carré est la donnée initiale. Dirigée perpendiculairement au fût, elle nous fournit en A le centre de l'arc am . Cet arc se termine en un point m que l'on obtient en prenant sur le côté ab du carré générateur une longueur an égale à la demi-diagonale, et tirant Am . Prenons le milieu B du rayon Am : il donne précisément le centre du second arc mv . La courbe est à deux centres, et les positions de ces centres sont A et B .

Passons à l'épure 1. Il est probable qu'elle est conçue d'après le même esprit et que, en égard aux sujétions de la gravure sur grès, les lignes utiles ont seules été conservées. Et en effet [fig. 5] un carré identique à celui de la fig. 6 donne la clef de tout le tracé. Le rayon du cercle inscrit à ce carré est 0^m 375. Élevons sur le fût, au point choisi pour la naissance de la courbe, la perpendiculaire sA' . À 0^m 375 au-dessus, menons-lui une parallèle, et établissons sur cette parallèle le carré générateur $a'b'c'd'$. Soit B' le centre de ce carré ; le profil sera, comme le précédent, une courbe à deux centres dont voici les positions : Le premier arc $s m'$ a son centre au point A' déterminé par la rencontre de la ligne sA' avec le prolongement du côté $b'c'$; et la droite $A'B'm'$ fournit en m' le point où se termine le premier arc. Le second arc $m'v'$, qui se raccorde avec le premier en m' , a son centre au point B' lui-même, et s'arrête en un point v' déterminé par une droite $s v'$ issue de la naissance s et parallèle au côté du carré.

Telle paraît être la génération des courbes. Incidemment on remarquera que le caractère de courbes à deux centres les rapproche des profils mêmes des voûtes surhaussées de l'Égypte.

Non seulement la géométrie domine les formes, la métrique règle les dimensions. Dans le tracé fig. 1 la hauteur totale est de 5 pieds. Dans les deux tracés l'inclinaison des arêtes du fût est au $\frac{1}{2}$; et le diamètre du fût, mesuré à la naissance des courbures, est dans un cas $\frac{1}{4}$, dans l'autre $\frac{3}{4}$ de pied.

Reste une question : la signification des traits p et q de l'épure 1. Ces traits ne jouent aucun rôle dans le tracé de la gorge ; leur espacement n'est qu'à peu près uniforme, et les points où ils rencontrent la courbe n'ont rien de remarquable. Voici, croyons-nous, comment ils se justifient. Pour exécuter [fig. 7] le moule sur lequel fut martelé le cuivre, il fallait se guider à l'aide d'un contre-profil, d'un "gabarit" ; et ce gabarit, comme ceux dont nous faisons usage aujourd'hui, était un châssis à claire-voie composé de planchettes assemblées. Les traits p et q , en apparence superflus, auraient marqué la position des traverses.





9, CONDUIT STREET, LONDON, W., 27th August 1904.

CHRONICLE.

The Institute Visit to Newcastle, 6th to 8th October.

A brief outline of the arrangements for the Institute visit to Newcastle-on-Tyne appeared in the last number of the *JOURNAL*, p. 482, and further details are now appended. The President, Past Presidents, and Council of the Northern Architectural Association will form a reception committee to welcome the visiting members on their arrival on Thursday evening, 6th October, at the County Hotel, which will be the headquarters of the Institute during the visit. Mr. Alderman Andersen, Mayor of Newcastle, will receive the visitors in the Council Chamber at the Town Hall at 10 A.M. on Friday, and deliver an address of welcome on behalf of the City of Newcastle. The members will then proceed to the Lecture Theatre of the Institute of Mining and Mechanical Engineers in Neville Street, where about an hour will be devoted to the reading and discussion of a Paper, "Specialism in Architecture," Mr. John Belcher, A.R.A., *President*, in the chair. The remainder of the morning will be occupied in visiting the Cathedral Church of St. Nicholas and Trinity House, and the visitors will be entertained at luncheon at the County Hotel by the Northern Architectural Association. In the afternoon of Friday visits will be paid to places of interest in the city and neighbourhood, including Jesmond Dene House, the residence of Sir Andrew Noble, K.C.B., and St. George's Church, returning through Jesmond Dene.

The President will hold a reception, and the Annual Dinner of the Institute will take place, on Friday evening, at the County Hotel.

On Saturday arrangements will be made, for those who desire to do so, to visit Hexham Abbey and the Roman Station at Chollerford. The Museum at Chesters will be visited, by the kind permission of Mrs. Clayton, on whose estate part of the Roman Wall is situated. Under the guidance of Mr. Frank Caws [F.], *Past President N.A.A.*, a visit will be paid to the new ship-building sheds at Messrs. Swan & Hunter's, Wallsend.

Members desiring to be of the visiting party or

to be present at the Annual Dinner are requested to communicate with *The Secretary R.I.B.A.* at as early a date as possible. The Northern Association has in preparation a Handbook for the visitors, comprising a programme of the arrangements, particulars of hotel accommodation, a map of Newcastle, and a guide to the various places of interest in the city and neighbourhood.

Leeds & Yorkshire Society: Architectural Education.

A school of architecture is now established in connection with the Leeds and Yorkshire Architectural Society. The classes are conducted by arrangement with the University of Leeds and the Leeds Institute at their respective institutions. The curriculum, covering nearly the whole of the subjects required for the Institute Examinations, is as follows:—

Preliminary.—Elements of plane geometry; geometrical drawing; elements of perspective; elementary mechanics and physics; freehand drawing from the round.

Intermediate.—History of Mediæval and Renaissance architecture; theoretical construction; descriptive geometry; elementary applied construction.

Final.—Design (subjects quarterly adjudicated upon by the Council of the Society); nature and properties of building materials (this class is held at the Society's rooms and conducted by its own lecturer); arrangement and construction of buildings in relation to health; specifications and estimating.

In addition to the above courses, the University of Leeds gives instruction in mathematics, mechanics, civil engineering, sanitary law, drainage and engineering problems; and the Leeds Institute in drawing, painting, designing, modelling, and carving. The Society arranges visits of inspection to buildings and courses of evening lectures, and offers annually various prizes. The Society's library, comprising 584 volumes, is lodged with the Leeds Central Public Library, where members may obtain the books on loan.

Classes for architecture (Lecturer, Mr. F. Musto [A.]) are held at the City of Bradford School of Art, special attention being given to the preparation of the testimonies of study required for the R.I.B.A. Examinations. It is intended, on the completion of the new School of Art buildings, to bring the teaching still more into line with the Institute examinations, architectural design being especially kept in view.

Edinburgh School of Art.

At the Royal Institution School of Art, Edinburgh, under the Board of Manufactures, the architectural curriculum extends over five years. The study of Classic, Renaissance, and Mediæval arts, colour, decoration, modelling, figure-drawing, perspective, and sciography, and their application, forms the basis of the training. Arrangements have just been made for a course of lectures on

architectural history, to be given next winter, specially for students preparing for the R.I.B.A. examinations.

St. Bartholomew the Great.

Mr. W. Arthur Webb [A.], of 27, Nottingham Place, W., writes:—

"As a lover of old buildings, and especially our London churches, I venture to call the attention of our members to the work of restoration still in progress at the Church of St. Bartholomew the Great. May I suggest that we follow the example of another periodical, in its shilling subscription for a statue to Milton, and have a similar fund for those who would like to show practical sympathy in assisting the rector and churchwardens in this good work? I should be pleased to forward and acknowledge subscriptions on behalf of the committee."

The Royal Victorian Institute.

From the Royal Victorian Institute of Architects have been received the bi-monthly parts composing the first volume of their *Journal of Proceedings* commenced last year. The work is edited by a committee of members, and is very tastefully produced under the direction of Mr. Blamire Young, of Melbourne. The illustrations, all of them line-engravings, the head-pieces, tail-pieces, pictorial advertisements—everything in the book, in fact—appears to have been designed and arranged by the same hand. The ordinary half-tone process block employed for the great bulk of modern book illustrations is dropped altogether.

Among the many interesting papers is one by Mr. Percy Oakden [A.] advocating on behalf of the local architectural student the establishment in Melbourne of an Architectural Museum. The Australian student naturally works at a disadvantage compared with the home student in being completely cut off from the noble and precious architectural monuments which the latter has so close at hand. Mr. Oakden's museum would have courts illustrative of the leading forms of architecture in its more important periods in different parts of the world. The courts would be stored with casts of architectural detail, and illustrations representing the development and perhaps the ultimate decay of the style indicated. Each court would be hung with photographs exhaustively illustrating the style, and its literature would be separately exhibited in a branch library attached to the court. The building would include a large hall for popular lectures, and rooms for class-teaching. Every description of work bearing on architecture would be illustrated—stained glass and decorative treatment of every kind, as well as casts and illustrations of more constructive ornament. Mr. Oakden realises that in its complete form such a museum would be a costly and extensive affair, and that at present it can only be considered as a

dream of the future. He suggests, however, that a beginning might be made at once by forming a collection of photographs, and grouping and classifying them on the lines indicated. Students might thus visit in thought the architectural wonders of other countries, and trace the progress and features of architectural styles in a far more realistic manner than can be done by reading alone. Judging by the discussion, the meeting was in favour of the proposition, and promises of support were given to the scheme should effort be made to carry it into effect.

There is a cleverly written paper on "Garden Design in Relation to Architecture," by Mr. W. R. Butler, who insists on the necessity of architectural character in the design of a garden, and that therefore it should be designed by an architect. Every architect, the author observes, knows that if designing were left to the plumber the house would be covered with pipes, or if left to the plasterer it would be a mass of vagaries in plaster ornament. One tradesman cares nothing for the work of another in equally important parts of the structure. So in gardening, the horticulturist or landscape gardener has not the broad grasp of things that is necessary to successful garden design.

The other papers are: "Standards of Size, Quality, and Strength in Relation to our Building Contracts," by Anketell Henderson; "Design of Australian Country Houses," by Chas. A. D'Ebro; "Some Thoughts on Architectural Design," by Robert J. Haddon; "Melbourne's Ever-flowing River," by W. Thwaites, engineer-in-chief to the Melbourne and Metropolitan Board of Works; and "The Streets of Melbourne from an Architectural Point of View," by W. M. Campbell.

The late Frank Manoah Kent [F.].

Mr. Edwin O. Payne [A.], of Durban, sends details of the tragic death, on the 7th ult., of Mr. F. M. Kent, of Pietermaritzburg, who was elected a Fellow of the Institute only so recently as last February. Mr. Kent had had occasion to reprimand his house-servant, a native, and the latter shortly after entered the room where his master was sitting at breakfast, and shot him through the head from behind with a revolver. Finding him not dead a few minutes later, he fired two more shots at him with fatal effect.—Mr. Kent, after serving his articles with Messrs. W. F. Hemmell and J. Smith [F.], of Sheffield, came to London as assistant to Messrs. Beeston and Burmester [F.], and afterwards to Mr. E. W. Mountford [F.], remaining with the latter about three years. He went to Natal in 1894, and in partnership with Mr. Matthew B. Price [F.] had carried out some important works in the colony, including the Girls' Model Government School, Durban, the Diocesan College for Boys, Balgovan, the Agricultural Hall, Estcourt, and various hotels.

PLENUM VENTILATION AND THE ROYAL VICTORIA HOSPITAL, BELFAST.

The Architects and Engineers of the Belfast Hospital send the following reply to Mr. Bibby's remarks on this subject in the last JOURNAL:—

The persistent misstatements of Mr. G. H. Bibby are our excuse for occupying more space in the JOURNAL. His calculations are altogether erroneous; for, even if fair comparison could be made between the old, overcrowded, badly ventilated hospital, with inadequate heating and hot-water supply, and the new one, it would stand thus, as regards the average coal consumption per resident provided for—viz. in the old, 3 tons; in the new 4½ tons, the latter including laundry work and other conveniences which found no place in the old, for since the new buildings were occupied, the efficient heating, ventilation, and hot-water supply have been kept up throughout, although the full complement of residents has not been attained. So much for his figures.

Although there appeared an appreciative article by Mr. Bibby on "Plenum Ventilation" in the *Local Government Journal* of May 1903, his remarks on the ventilation of this Hospital are so evidently prejudiced that previously we ignored them. He has, however, appealed to the printed annual report for verification of the accuracy of his statements; how, then, did he overlook this, which appears on page 17?—viz.: "The staff desire to express their great satisfaction with the new hospital, which is fully answering their highest expectations." Also an official statement made at the last ordinary meeting of the Board of Management, reported in the *Belfast News Letter* of 8th July, which runs thus: "Now that the system of ventilation has been thoroughly tried both in summer and winter, a proper estimate can be formed of its merits, and the opinion of the hospital staff is that it is a great success."

In face of such evidence from those who have had daily experience of its working, it can only be supposed that Mr. Bibby was mistaken in his observations; a charitable interpretation is that he was following in the wake of a nurse or attendant whose clothes had become saturated with antiseptics—not an unusual occurrence where surgical operations are conducted.

It would appear from his remarks that there is lack of outlook for the majority of the patients; but it is only to the separation wards, accommodating in all thirty-two out of a total of 300, that no ordinary windows are provided; yet those and the larger wards are better lighted and as cheerful as the average of hospital wards. We can assure Mr. Bibby that he need have no fear of a breakdown of the ventilating arrangements or of the disastrous results which he anticipates, for they exist only in his imagination.

On recently visiting the hospital careful inquiries were made, but no confirmation was forthcoming as to his statements. He was not shown over, or even seen, by the superintendent, neither could diligent search discover his doctor afflicted with headache. Moreover, there is not a word or figure in the annual report to confirm what he advances. The tabulated statement of expenditure, page 47, refutes his charge of extravagance in the new hospital, for notwithstanding additional coal consumption, the average cost per patient treated has been less. These are the figures:

	Cases treated.	Total cost.	Average per case.
For year 1902	2,007	£9,381 11 4	= £4 13 6
" " 1903	2,298	10,509 15 9	= 4 11 0½

Or, as the superintendent recently said to us: "The patients and staff are now better housed, better fed, better cared for, and perform their duties with greater comfort than in the old hospital, at practically the same cost per head."

There may be nothing very extraordinary in this; but when Mr. Bibby goes out of his way to condemn, and appeals to a document to confirm his statements, we give these quotations therefrom to show what reliance can be placed on his accuracy.

He may be reminded that it is no fault of the architects or engineers that every bed is not occupied. The committee wisely provided for future requirements, and it is not very surprising that, in addition to paying off the cost of the new buildings, funds are not at once forthcoming for nearly double the number of patients. Many of the beds have never been occupied; it is therefore a misuse of terms for him to state they have been "closed," particularly as he implies that the coal bill is responsible.

Mr. Bibby must surely know that his unreliable statements (to describe them mildly) are not only ungenerous, but apt to mislead his brother architects on a subject of considerable importance to the health and well-being of his fellow creatures.

WILLIAM HENMAN & } Architects.
THOMAS COOPER, }
HENRY LEA & SON, Engineers.

10th August 1904.

THE BRITISH ASSOCIATION.

Municipal House-owning.

Dr. William Smart, Adam Smith Professor of Political Economy in the University of Glasgow, delivered the address in the section of Economic Science and Statistics, taking for his subject the Housing of the Poor and the method of dealing with the problem adopted in Glasgow. The real housing problem of to-day, he said, narrowed itself down to this: How far did the experience gained point in the direction of the municipality itself building and owning houses for certain of the poorer classes?

For a municipality, deliberately and of set intention, to add a new competitive industry to its already manifold activities was a serious matter from three points of view. (1) House-owning was a business, neither a routine business nor one where success was certain. So far as it had not a monopoly, a municipality could not presume upon demand—could not command a remunerative sale for what it provided. As a builder, it had advantages and disadvantages; as an owner, it had also advantages and disadvantages—particularly, perhaps, in that it had a conscience. Assuming, however, that a municipality could manage its enterprises as well as private citizens managed theirs, and that its house-owning covered all recognised expenses and ran no risk of coming upon the rates, what must be emphasized was that it pledged the future ratepayers for the security of all the capital borrowed. It was short-sighted to conceal the dangers and responsibilities of this by calling such a debt “productive.” Borrowed capital changed into stone and lime certainly remained an “asset,” but whether the asset was worth much or little or nothing depended on the value which future generations would put upon it. A tenement of houses, by change of circumstances, might lose its rent-producing capacity and call only for demolition long before it had suffered much deterioration as a building. In such circumstances the ideal kind of house would be one constructed to last, say, thirty years at the outside. But this, of course, was the last thing that municipalities in their present mood would think of doing, and they generally made it impossible by their own building regulations. Besides this, there was the consequence of the “economic trespass”: dwelling-houses for the poor generally took up the space of buildings of a more remunerative character, and so kept down the rateable value of the area, while increasing its expenses. (2) The municipality entered into direct competition with many of its own ratepayers, competing not only with the comparatively small class of builders, but with the great class of owners of house property. Free competition of producers to serve the public was, of course, a good thing, and in nothing, perhaps, was it more desirable than in the purveying of houses, where the length of time required for erection tended to some extent towards monopoly. But competition was good because and to the extent that it kept down prices by increasing supply, and the action of a municipality working with money borrowed at a gilt-edged security rate was very likely to have the opposite effect; it might result in a positive diminution of the total supply of houses, and so a rise of rent, by reason of the discouragement given to private builders through the appearance of a rival with whom they could not compete on equal terms. (3) By pledging the public credit for a new debt, and adding a new activity and responsibility to already overworked

members of the municipality, it *pro tanto* prevented the expansion of municipal activity in other directions. These were considerations against municipal building and owning derived from the general principles which should, in his opinion, regulate all municipal expansion. They were not, of course, decisive against it, but they suggested that very definite and weighty reasons must be put forward on the other side.

Productive Value of a Healthy House.

It was far too little realised, Dr. Smart observed, that a sanitary and comfortable house among quiet neighbours had a “productive value,” and was, quite definitely, one of the factors of wage-earning; in other words, a good house, as compared with a slum, brought with it the possibility of paying a higher rent for it. In view of the actual circumstances of slum life in every large city, and in view of the hopelessness of escape on the part of the low-paid wage-earner from contagious influences, there seemed *prima facie* a strong case for the provision of at least one and two roomed houses by an agency which would aim primarily at affording to the tenants the conditions of health, morality, and efficiency, not only in the construction of the houses, but in their continued administration and control. He had always held that the owning of poor-class property carried with it a moral responsibility which was not escaped by the owner shutting his eyes and leaving the administration to his factor; and, on similar grounds, much might be said for a municipality owning and letting all the small houses within its area. This would at least secure a “clean city.” Such a position, then, was quite intelligible as a counsel of perfection, and it might be worth consideration in the case of a city planned, like a garden city, from the beginning. But, in the actual circumstances of our cities, he mentioned it merely to bring out his point. For there was no proposal before any municipality of to-day of taking over and making a monopoly of the supply of small houses, or even of building all the small houses in the future. The utmost that had been proposed was the building and letting of a limited number of such houses in direct rivalry with private builders and owners. And the question which must be answered was, on what principle, or with what view, was this limited proposal made? If it were to afford an experiment and an object-lesson, as was done with the happiest results in the case of the corporation lodging-houses in Glasgow, where the rise in the standard not only swept out the old and very objectionable lodging-houses, but led to the large increase of private “models” competing successfully with the municipal ones, there would probably be nothing but approval. But if the proposal was made in the full recognition that such an experiment was not an object-lesson, inasmuch as it could not be followed by private enterprise; if the reason given

for it was that a certain class of tenants could not pay the rent which private enterprise must have if it was to continue its supply, and that the municipality, as having command of capital at a very low rate of interest, could afford to undersell the market rents without coming on the rates, the matter was put on an entirely different basis. The attractiveness of a "clean city" was one thing, the attractiveness of low rents another.

Objections to Municipal Ownership.

In the limited proposal now considered (Dr. Smart continued) what was being advocated was Government provision of a certain commodity for one class alone, and the ground taken undisguisedly was that Government could provide this commodity more cheaply than private enterprise could, and that this class could not afford more. There were two propositions here which could not be allowed to pass without examination; the first was that there was a class which could not afford the higher rent; the second, that this was a valid reason for the municipality providing them with a lower one. (1) Somewhat to the surprise of the Glasgow Municipal Commissioners, it was given in evidence that, while wages generally had risen, there were labourers in Glasgow who were not earning more than 17s. a week—and these not casual labourers, but able-bodied men, in regular employment, and of ordinarily steady habits. His reason for doubting if even this class "could not afford" 6d. a week extra for a house was that one of the causes, perhaps the principal one, why such men earned only 17s. was that they lived in conditions which lowered health and efficiency, and made them inefficient workers. He fully acknowledged that such people could not pay 6d. extra for the rent of a slum such as they were occupying, but he could not forget the "productive value" of the modern higher-rented house. It seemed to him that fresh air, and quiet sleep at nights, and surroundings which would react on the character and conduct of the person on whom so much depended—the wife—might easily add far more than 6d. to the earning power of the household. There was, unhappily, a class to whom this did not, directly at least, apply. There were thousands of women workers whose wages were not 17s., but an average of 12s. To these a good house would have a greater "productive value" than to men, for they were more subject to the illnesses and little ailments and depression which docked their wages by hours in the day and days in the month. So far as he could see, they were outside the housing question altogether, from the fact that they could not afford an independent house even at the lowest municipal rents. They must remain in the family as subsidiary wage-earners, or club together, or lodge. (2) But, assuming the very strongest case—that there was a class of unfortunate people who absolutely could not afford to pay 6d. a week more,

he should still say that this in itself was no reason why the municipality should build. To supply them with houses under the market rate would be to introduce a new precedent and principle into Government industries which would lead us far. It would be using the credit of the entire body of the ratepayers to subsidize one small class of them; it would be, in essence, similar to the old legislation which kept down the price of bread when the harvest was bad, without the extenuation that such a measure kept down the price to everybody. It would be a rate in aid of wages. And if there was any lesson to be learned from the bitter experience of a century ago, it was that the evil of a rate-in-aid was, not so much that it punished those who had to subscribe to it, as that it punished those who received it, in that it effectually prevented wages from rising. Unfortunately there was in all large cities a class who, from physical and mental disqualifications, from want of education and technical opportunity, and from want of organisation, must take very much the lowest wage which would keep them in life and moderate animal efficiency; and this class tended to be in oversupply from the fact that misfortune drained into it the failures of all the other classes. For a municipality to give these unfortunate people houses 6d. a week cheaper was to allow of them accepting 6d. a week less of wage than the circumstances would otherwise force the employer to give. As Mr. Booth said:—"The poverty of the poor is mainly the result of the competition of the very poor." If, then, it became known that, in addition to the other attractions of a city, good houses at slum rents were assured to every one who was poor enough, it seemed inevitable that this would further tempt the influx of unskilled labour—and, unhappily, farm labour, skilled in its own fields, became unskilled when transferred to the streets and factories.

Dr. Smart concluded this part of his address by showing that there were circumstances in the evolution of a city like Glasgow which would justify the relaxation of the general principle that municipal house-owning should be avoided.

Early Cretan Civilisation.

Dr. Arthur J. Evans gave an address on a preliminary scheme for the classification and approximate chronology of the periods of Minoan culture in Crete from the close of the Neolithic to the Early Iron Age. He observed that the accumulated results of recent Cretan discovery, and in a principal degree those of the Palace site of Knossos, had greatly added to the data for fixing the comparative chronology of the early Cretan civilisation. To the period between Neolithic times and the Early Iron Age as a whole he proposed definitely to attach the name Minoan as indicating the probable duration of successive dynasties of priest-kings, the tradition of which

had taken abiding form in the name of Minos. The use of the word "Mycenæan" required radical revision, the Mycenæan culture being in its main features merely a late and subsidiary outgrowth of this great "Minoan" style, when the fine motives of the last Palace period were already seen in a state of decadence. This decadence was already observable in the sherds found in the Palace of Tel-el-Amarna about 1400 B.C., and even in somewhat earlier relics associated in Egypt, Rhodes, Mycenæ, and elsewhere, with cartouches of Amenhotep III. and his Queen. The recently discovered cemetery at Knossos showed the less decadent forerunners of this style, though still later than those of the last Palace period, the end of which was thus carried back at least to the close of the sixteenth century B.C.

Dividing this Minoan era into three main periods—early, middle, and late, each with a first, second, and third sub-period—the third late Minoan period might be roughly dated between 1500 and 1100 B.C. The second late Minoan period received its fullest illustration in the remains of the latest Palace period at Knossos. The contents of the recently discovered royal tomb at Knossos included alabaster vessels belonging to the beginning of the eighteenth dynasty, and went to show that the second sub-period might have extended from about 1700 to 1500 B.C. The next was an age of ceramic transition with an earlier system of linear script, and a period when naturalistic art reached its highest perfection in Minoan Crete, as was shown by such masterpieces as the faience relief of the wild goat and its young. It could be placed approximately between 1900 and 1700 B.C.

The "Middle Minoan" Age was especially characterised by the development of the polychrome style of vase painting on a dark ground, and was the period of the conventionalised pictographic script that preceded the linear. The so-called "Kamaraes" style flourished in the second Middle Minoan period, the beginning of which was approximately dated by the painted sherds found by Professor Flinders Petrie at Kahun, dating from the time of Useratesen II. of the 12th dynasty—i.e. about 2300 B.C., or, accepting the chronological calculations of Professor Petrie and others, the date would be nearly 2700 B.C. The Kahun deposit included objects of the simpler style belonging to the First Middle Minoan Period. Allowing some time for the gradual development of the fine Middle Minoan polychrome style, the beginning of the first period of this great age might reasonably be thrown back at least to the middle (perhaps to the beginning) of the third millennium B.C. Beyond this date lay another long cycle of nascent culture included in the various phases of the Early Minoan Period. The prevailing decorative style was now geometrical, generally dark ornament on a light ground, but the dark glaze slip itself went back to the confines of the Neolithic Period. The lowest

or sub-neolithic stratum there brought out showed light-ground technique already beginning as a consequence of the introduction of the potter's oven. The spiral also now appeared for the first time on steatite vessels and incised pottery. This period was characterised by its special class of seal stones with pictographic designs in their more primitive stage. Many seals showed the adaptation of motives from a sixth dynasty class of button seals.

These and other Egyptian connections showed that it would not be safe to bring down the beginnings of the Early Minoan culture later than the middle of the fourth millennium before our era. The section in the west court of the palace showed the earliest Minoan floor level at a depth of 5.32 metres below the surface. Below this again were at that point 6.43 metres of neolithic strata. Assuming that the average rate of deposit was fairly continuous, this gave an antiquity of about 12,000 years for the earliest neolithic settlement in Knossos.

Exploration in Crete.

Mr. R. C. Bosanquet, Director of the British School at Athens, described with lantern-slide illustrations this year's excavations at Heleia (Palaikastro) and Praios in Eastern Crete. The late palace yielded an important series of painted vases and terra-cotta figures; while in the town very valuable finds were two delicately carved ivory statuettes, a large bronze ewer, and a richly painted bath. In the cemeteries were found seals of ivory and steatite, a miniature gold bird, small models of a dagger and of sickles, beaked jugs, and a remarkable clay model of a boat. A later cemetery, containing larnax burials, yielded bronze implements, beads, and vases like those in the palace magazines. Mr. Bosanquet also described numerous architectural inscriptions found during the researches at Praios, the most important one being in the ancient Eteocretan language, hitherto known only from one or two inscriptions, and being in Greek characters of the third or fourth century before our era.

REVIEWS.

ENGLISH ARCHITECTURE.

English Architecture. By Thomas Dinham Atkinson. 8o. Lond. 1904. Price 3s. 6d. net. [Methuen & Co., 36, Essex Street, W.C.]

A handy little text-book or primer of English Architecture, suited to the requirements of students, professional and amateur alike, written and illustrated by Mr. Thomas D. Atkinson, of Cambridge, has recently been published by Messrs. Methuen. At the outset, let me give it a cordial welcome, and express the hope that it may meet with a large circulation. It is just the volume required to place in the hands of a youth entering upon his

articles, who is wishful to obtain an elementary knowledge of the architecture of his own country.

Following Rickman's "Attempt to Discriminate the Styles of Architecture in England from the Conquest to the Reformation," for a lengthy period Parker's "Introduction to the Study of Gothic Architecture" has been in vogue as a text-book, and its popularity has been well deserved. It has been a stepping-stone in the pursuit of knowledge to many a youthful architect during the latter half of the nineteenth century, and long may it continue to flourish. There is room, however, in the present day for other handbooks dealing with the subject on somewhat different lines and approaching it from a modern standpoint, in which due importance is given to the gradual growth and evolution of the art.

This want has been largely met by the arrival of Mr. Atkinson's little book, which not only treats upon English Architecture from Saxon times to the age of Elizabeth, but also extends the survey through the period of the Renaissance to the end of the eighteenth century. Mr. P. Leslie Waterhouse, it is true, in his popular "Story of Architecture," has done something in this direction, but his little work does not confine itself only to English buildings. On the other hand, in its brief way it is all-embracing, and, beginning with the Egyptian Pyramids, finishes with the description of an American "sky-scraper."

Returning to Mr. Atkinson's volume, an interesting Introduction, which should certainly be read, serves as a prologue to his further discourse. This is followed by three chapters descriptive of the characteristics of English Architecture, which he classifies under the headings of Romanesque, Gothic, and Renaissance, and deprecates the customary practice of dividing English mediæval architecture into several distinct styles, which suggests the idea of "definite breaks in the continuity of the art." The information, which might be amplified with advantage in a further edition, is conveyed in a readable manner, and is supplemented by some capital illustrations from sketches by the author. Plans showing the methods and development of vaulting during the Gothic period, accompanied by a lucid and not too technical description, increase the value of the second chapter; also adding to its interest is a sketch of the development of window tracery. Like all of us, Mr. Atkinson has his preferences and his prejudices. Speaking of thirteenth century "geometrical" tracery, he says, "it is at this period that tracery reaches its highest perfection of beauty and fitness." His opinion will probably be shared by others, but much as we may admire the "perfect tracery" of the triforium arcades of Westminster, some of us take an equal delight in the "flowing tracery" of the later Decorated period, such as is seen in the magnificent west window of York Minster.

In the chapter on English Renaissance, whilst full justice is done to the genius of Inigo Jones

as an artist, Wren's abilities, the largeness of his general conceptions, and the ingenuity he displayed in the solution of difficulties are fully recognised. The masterly plan of the latter for rebuilding the City of London after the Great Fire is given microscopically on page 85. Surely, for purposes of examination, it demanded a full-page illustration.

In referring to the architects who flourished during the latter part of the eighteenth century, are not the brothers Adam treated rather below their deserts? Can it be seriously maintained that a "combination of the finicking and the dull culminated in their work," and is not the assertion rather too sweeping? Of the four brothers, Robert Adam would generally be acknowledged to be an artist whose interior decorative work is characterised by much beauty and refinement.

Chapters IV, V, and VI are devoted to a description of churches, monasteries, and houses respectively, in which their development in each case is traced in a logical manner, and a large amount of knowledge is brought to bear upon the subject.

The growth and additions to the parish church of Coton from Norman times to the present day are illustrated on page 121; figs. 152 and 155 give us plans of the Benedictine monastery at Norwich and the Cistercian buildings at Furness Abbey; and on page 166 we meet with plans of Haddon Hall, a typical Tudor house with two courts.

A comparison drawn between French and English ecclesiastical architecture in mediæval times, some interesting observations on the influences giving rise to local varieties of style and workmanship, and a summary of the history dealt with, form the material of the concluding chapter, which is followed by a valuable appendix.

The latter comprises a chronological list of buildings and architects, a table of the periods of English architecture, and a table of the Religious Orders in England at the time of the general suppression by Henry VIII. The volume is completed by a short glossary and an index.

Reverting to Mr. Atkinson's introduction, where he mentions several works which can be recommended to architectural students for further study, he concludes by saying, "However delightful books may be, and necessary as they are in some branches of the art, the true way to study architecture, the only really satisfactory way, and by far the most attractive, is the close examination of the buildings themselves."

Most excellent advice, to which I should like to add a postscript. If the student wishes to impress upon his memory what he has seen, let him be accompanied by his sketch book and measuring rod, and—shall I say it?—leave his camera at home! At any rate, if the camera is taken, let it occupy a merely secondary place in his equipment. The photographic print should never take the place of the student's drawing.

Leeds.

WILLIAM H. THORP.



Ruins of Mitla.—Principal Façade of the Palace of the Columns.

Photo by C. B. Waite, Mexico.

THE RUINS OF MITLA, MEXICO.

By CHARLES GROVE JOHNSON [F.], Mexico.

THE famous ruins of Mitla, which constitute one of the most remarkable prehistoric buildings on the American continent, are situated in the region inhabited by the Zapotec tribe, in Southern Mexico, at a distance of about twenty-five miles from Oaxaca, the capital of the State of the same name.

Although the ruins have been visited and described in recent years by such leading archaeologists as William H. Holmes, Dr. Edward Seler, Marshall E. Saville, Dr. Nicholas Leon, and others, they have never been measured and drawn by an architect. Viollet-Le-Duc, who describes them in his *Antiquités Américaines*, never actually visited Mexico, but compiled his observations from notes and photographs taken by the French traveller Desiré Charnay.

Thinking that a set of accurate measured drawings * of a prehistoric American building would be of interest to members of the Institute, I visited Mitla in the spring of this year, with the object of making a careful study of at least a portion of the ruins.

I was accompanied by H.B.M.'s Consul, Mr. Lucien Jerome, and Mrs. Jerome, both of whom rendered valuable assistance, the latter being photographer of the party. As the result of our expedition, I obtained sufficient measurements to make the plans of the best preserved building of the group, and to collect the notes which are here submitted.

On consulting the general plan [fig. 1], which is copied from Dr. Nicholas Leon's work on Mitla, it will be seen that there are four groups of ruined buildings (classified as Nos. 1, 2, 3, and 4), which have been indiscriminately named temples or palaces, as their original purpose

* The drawings sent by Mr. Johnson are all given, reproduced to a smaller scale, in the present Paper, with the exception of the longitudinal section of the Patio of Mosaics and Hall of Monoliths, Group No. 3, which cannot be conveniently reproduced in these pages, but which

may be seen in the Library of the Institute together with the originals of the other drawings and a number of photographic views of the buildings kindly presented by Mr. Johnson.—ED.

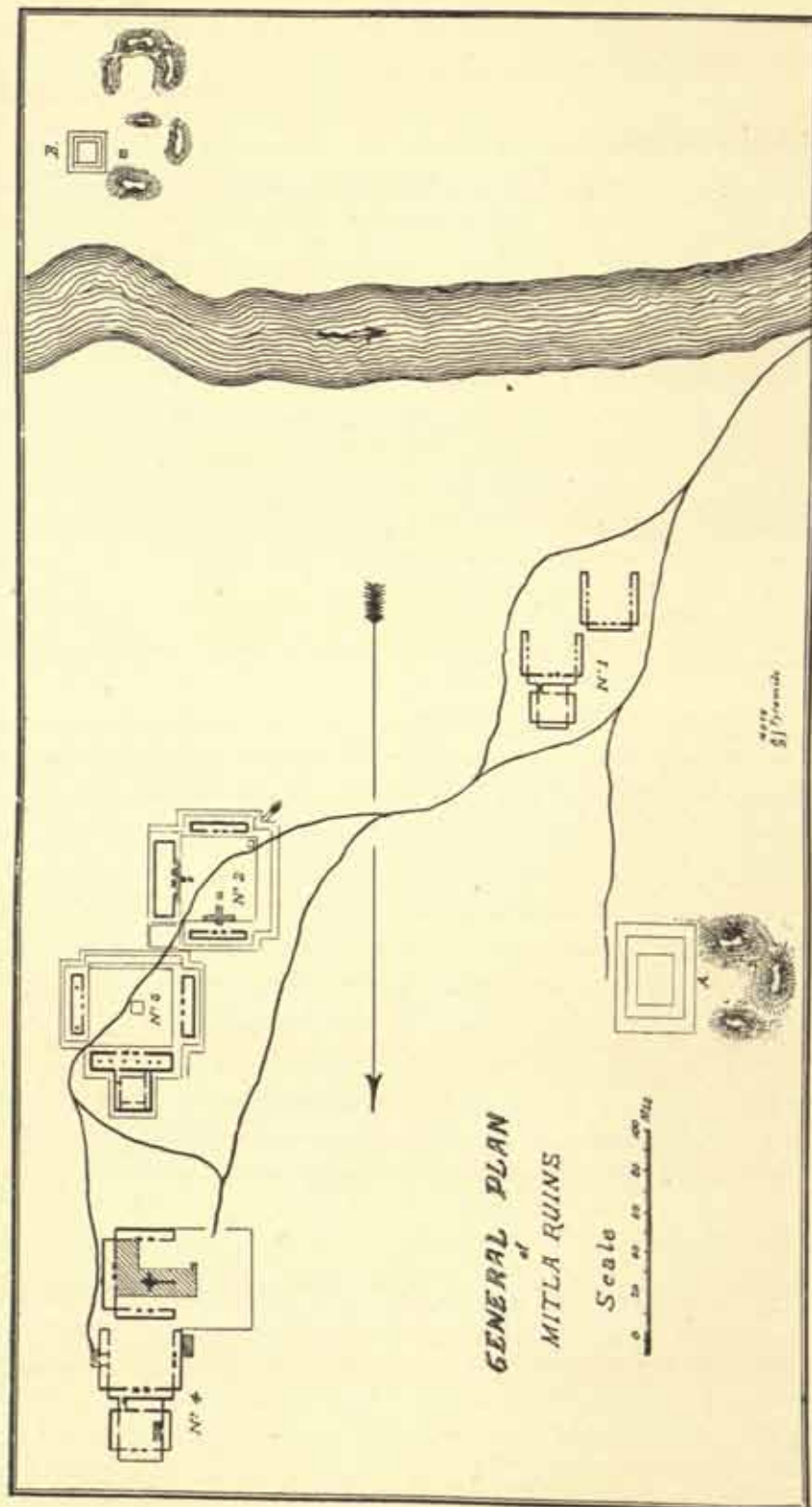


FIG. 1.—GENERAL PLAN OF THE MITLA RUINS.

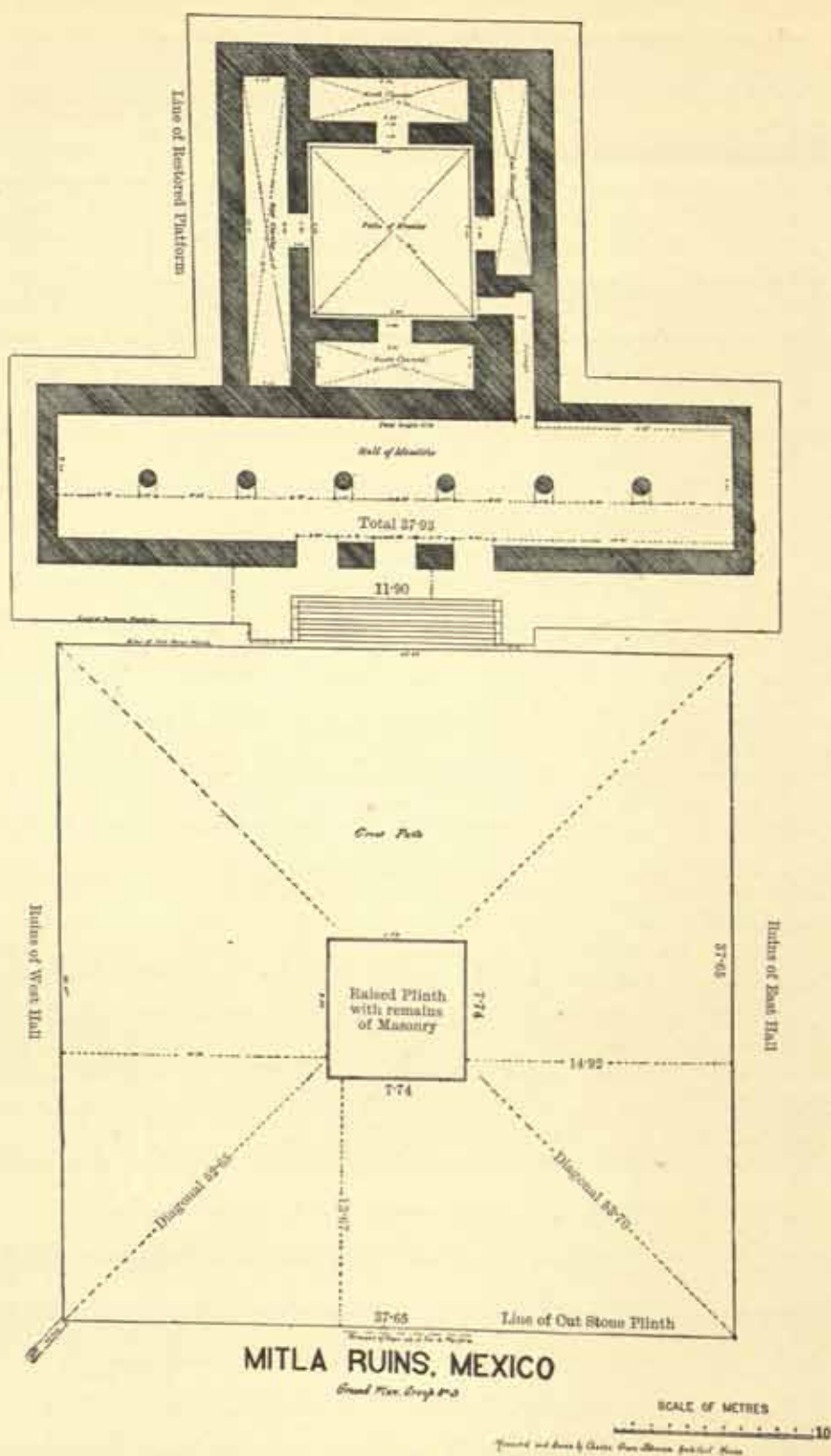


FIG. 3.

has not yet been determined, besides two pyramids or artificial mounds, which are marked A and B. The orientation of all the buildings is the same, being almost due north and south.

Each group consists of one or more courtyards, entirely or partly enclosed by long narrow chambers, which are raised on high platforms. Access to these chambers was gained only from the courtyard and by means of steep steps, of peculiar and characteristic section.

The following brief survey of each group may be of interest:—

Group No. 1.—The buildings of this group have not yet been excavated, and are buried in sand almost to the level of the soffit of the lintels of the doorways. The remains of hieroglyphic paintings which still decorate the face of the lintels are of particular interest, and have been published in colours by Dr. Seler. They are similar in style to the Mexican codices, some fine examples of which are preserved at the Bodleian Library at Oxford. I noticed that in the case of these wall paintings the surface of the smooth stone has been carefully covered with a thin coat of very fine plaster, on which the figures are outlined in Indian red.

Group No. 2.—The original appearance of a Mitla palace is best realised in this group. On entering its spacious courtyard, the three halls are seen standing complete on the north, south, and east sides, each with its triple doorway spanned by massive stone lintels. There are indications that the platforms on which these buildings are erected were originally in two stages, and of pyramidal section. The courtyard was cleared by Marshall Saville, who laid bare its original cement pavement. Only fragments remain of the cut stone facing which once covered the walls of the chambers, and also of the platforms and stairways. An interesting feature is the large drain, of which I give a drawing [fig. 2], and which is situated on the south-west corner of the courtyard. Its outlet is clearly visible on the exterior wall of the enclosure. This group is remarkable for the two subterranean cruciform chambers which exist under the north and east halls. One of these was discovered by Mr. Saville, who determined that they were sepulchral chambers, similar to those discovered at Xagá and Guiraróo, in the vicinity of Mitla.

Group No. 4.—The buildings of this group have suffered much, as for years they have been occupied as dwellings, and altered to suit the requirements of the Catholic Church. Originally there were three courtyards (*a*, *b*, *c*), in the first of which the parish church is built, its walls being mainly composed of dressed stones which have been torn from the ruins themselves.

Court *b* has now been turned into a residence for the parish priest. The entrance on the east side has been made by opening a doorway in the back wall of the original chamber, in front of which two ancient columns have been set up to form a porch. The latter must have belonged to either the east or west chamber of Group No. 2, as there is no evidence of any columns having been employed in the group of which we are now treating. The other chambers of this court have been altered in different ways to render them habitable.

The third inner court (*c*) was originally entered by a narrow passage from the back of the north chamber of Court *b*, a characteristic feature of the planning of the Mitla palaces which occurs also in Groups 1 and 3. This court is in a still more deplorable condition than the other two, for it is used as a stable and barnyard.

On the lintels of the doorways are remains of hieroglyphic paintings, which have also been published by Dr. Seler. These and the paintings in Group No. 1 constitute the only representations of living forms which have been found in the ruins.

Enough remains of the mosaic panels to reveal the former treatment of the wall surface, which is similar to that of Group No. 3.

Group No. 3 [fig. 3].—This, the most important portion of the ruins, consists of the great courtyard and an inner court, which is situated behind the North Hall, known as the Hall of Monoliths, or Columns. The Great Court measures 37·65 m. by 37·65 m. Its four sides are

equal, but, as demonstrated by the diagonal measurements, it is out of square. It has been cleared, and the original cement pavement is intact. In the south-west corner there is a cut stone drain, of which I give a section [fig. 2]. The pavement was sunk at the outlet of the drain, and the edges of the channel thus formed were carefully rounded off. Near the centre of the court is a raised plinth of cut stone which measures 7.74 m. by 7.74 m., and is 0.25 m. in height; it also is out of square. The remains of stone and adobe which are found on this raised space indicate that a small pyramid or sacrificial altar once stood here.

The court was formerly surrounded on the north, east, and west sides by three halls, and on the south side there are remains of a platform, with steps leading to it, which was originally the same height (3.15 m.) as the sub-structures of the other three sides on which the halls are built. Although in the restoration of the platform of the Hall of Monoliths, made for the Mexican Government, the sides are vertical, I am inclined to believe with Mr. W. Holmes that they were originally pyramidal in section—at least, on the inside of the enclosure.

The view of the East Hall forms the most picturesque portion of the ruins, its beauty being enhanced by its isolated standing columns and the great fallen lintel at the base of the platform. One lintel of the triple doorway still remains in place, though badly cracked and about to fall to pieces. Only a small portion of the walls remains standing, but it suffices to show that the façade of this hall was identical with that on the north side [fig. 4].

The ruins of a platform stand on the west side of the court, and are much overgrown with vegetation. Three stones of its plinth are still in place, and a monolithic stone column, which undoubtedly once belonged to the West Hall, lies in the courtyard [see *headpiece*, p. 513]. Remains of the cement pavement of the chamber are noticeable on the summit of the platform.



FIG. 4.—RUINS OF EAST HALL, GROUP NO. 2, SHOWING FALLEN LINTEL.
Photo by Mrs. Lucien Jerome.

On account of its remarkable state of preservation and its harmonious colouring, in which rose and yellow tints prevail, the façade of the Hall of Monoliths on the north side of the courtyard is the most impressive of all the Mitla buildings. It undoubtedly presents a perfectly harmonious and refined architectural composition.

With the exception of the entrance, facing the Great Court, the exterior is devoid of openings. The wall surface of cut stone is almost intact, and is divided up into the characteristic panels filled with geometric ornaments, which continue in an unbroken series round the entire building. The quoins are made to stand out boldly by means of square blocks of stone, which on analysis prove to be merely filled-up panels.

To quote the opinion of Viollet-Le-Duc: "The monuments of the golden age of Greece and Rome alone equal the beauty of the masonry of this great building. The facings dressed

with perfect regularity, the well-cut joints, the faultless bends, and the edges of unequalled sharpness bear witness to knowledge and long experience on the part of the builders."

The triple portal [fig. 5] spanned by huge stone lintels, the largest of which measures 5.05 m. by 0.80 m. by 1.30 m., gives entrance to its spacious hall the roof of which must formerly have been supported by the six monolithic columns which are still standing [fig. 6].

In the wall, facing the main entrance, is a small niche, of which I give a drawing [fig. 2, p. 515]. Similar niches face the entrances of all the Mitla halls, and may have been intended to hold an idol, with a small brazier of the copal gum which was burnt as incense.

Close by the niche is the entrance to the narrow passage [fig. 7] which, with a sudden turn at right angles, leads to the secluded inner court, popularly called the Patio, or Courtyard of Mosaics.

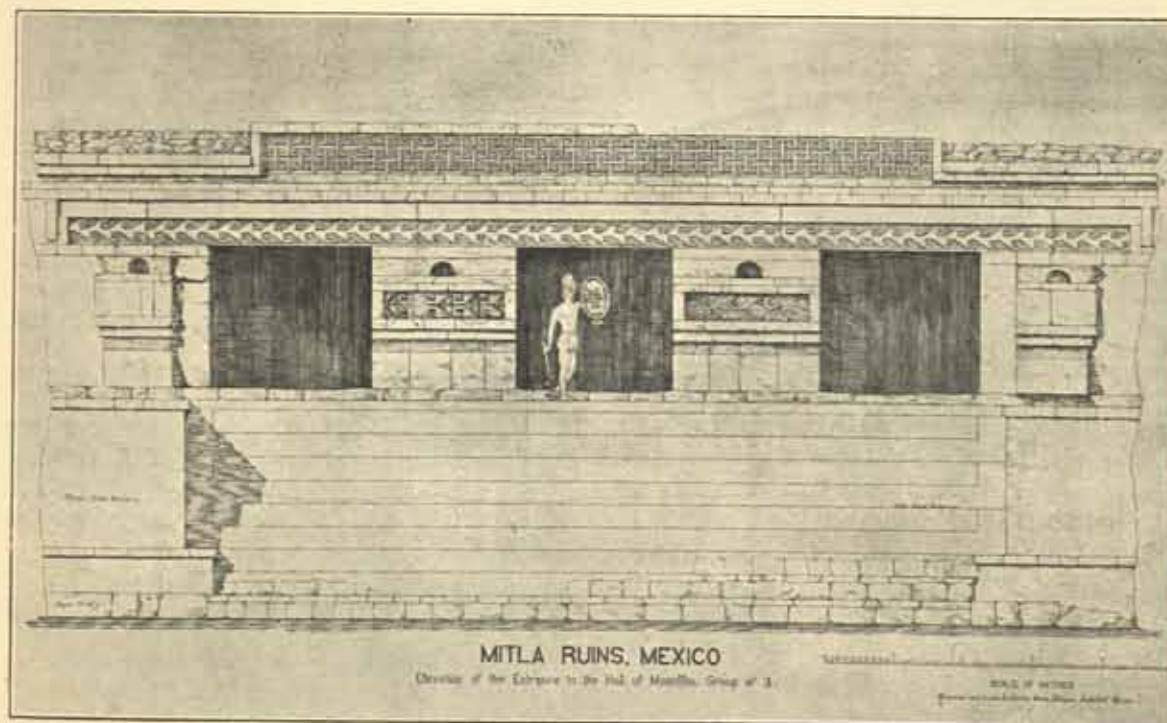


FIG. 5.

Measured and Drawn by Charles Grove Johnson [F.]

The stones which form the roof of this passage are carefully dressed, and measure in width from 0.70 m. to 0.90 m. I was unable to obtain their section, but they are probably similar to the lintel which spans the entrance to the passage, of which I give a measured drawing [fig. 2] and photograph [fig. 7]. It will be seen that this lintel measures 2.76 m. long: its depth is 0.53 m., and width 1.08 m. The doorway has monolithic jambs, which measure 1.70 m. high by 0.54 m. wide. This roof, and those in the narrow passage of Group No. 1, and in the subterranean chambers of Group No. 2, constitute the only remaining examples of the primitive method of roofing.

Surrounding the patio are four narrow chambers which were formerly lighted by the doorways only. It must be borne in mind that the amount of light derived from such an opening is much greater in the brilliant light of the tropics than it would be in the north. In Spanish buildings, as also in ancient Pompeii, the rooms giving on to the patio have commonly



FIG. 6.—HALL OF MONOLITHS, GROUP NO. 3.

Photo by Mrs. Lucien Jerome.

are decorated with what has been described as the characteristic mosaic-work of Mitla [fig. 8]. The term "mosaic" does not convey a true idea of these geometric ornaments, which are formed by embedding in the wall flat pieces of cut stone, the projecting edges of some of which form the pattern. The method used is somewhat analogous to that of ornamental brick-work, but, instead of being formed of stone bricks of uniform size, the laborious process has been adopted of cutting each stone separately to fit its place.

The geometric patterns thus formed are framed in panels, and with great ingenuity and skill were never repeated in the same position. Each wall of the patio, therefore, presents a pleasing variety of fresh combinations of the same designs.

In order to convey an exact idea of the peculiar and painstaking method employed, I have drawn and measured every stone of one of these panels—namely, that of the left pier of the centre doorway of the Hall of Monoliths. I submit two drawings of it [fig. 2].

A good effect of light and shade on the wall surface is obtained by the projecting and receding courses of masonry which divide the panels.

The treatment of the wall space in the

no other light than that admitted through the doorway. The modern Mexican hut has usually only one door, and ordinary occupations, such as cooking and sewing, are carried on at the threshold. The rooms are raised about 25 centimetres above the level of the patio, leaving at the entrance a rather high step, which difference of level would not have prevented the rooms from being flooded during the rainy season, unless the court had drains, of which, however, I failed to discover any trace.

The walls of the patio

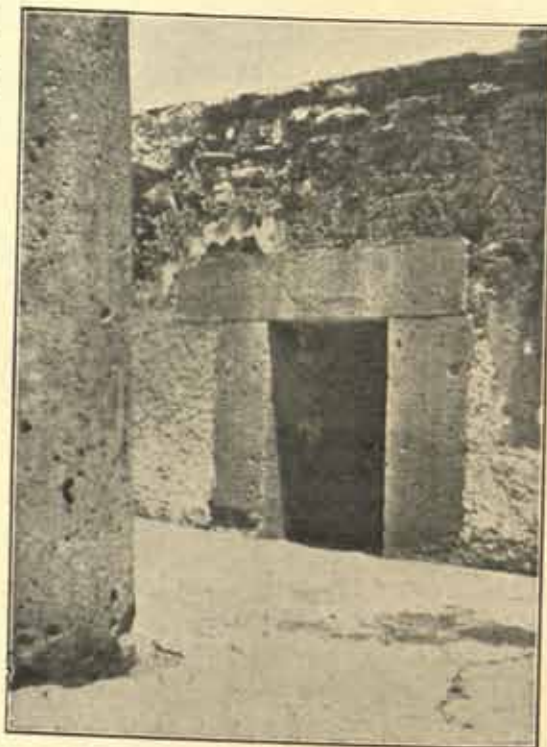


FIG. 7.—DOORWAY OF PASSAGE FROM HALL OF MONOLITHS TO PATIO OF MOSAIC.

Photo by Mrs. Lucien Jerome.

surrounding chambers is distinct from anything else in Mitla, the panelling being omitted. The walls have been plastered to a height of 1.30 m. from the ground, thus forming a dado. The remains of this plaster adhering to the west chamber are highly polished and of a rich Indian red colour. The mosaic patterns above the plain dado run continuously round the walls, and are divided only by small horizontal courses of cut stone.



FIG. 8.—SOUTH-WEST CORNER OF THE PATIO OF MOAICH.

Photo by C. D. Walke, Mexico.

It is obvious that the only difficulty which presents itself in running a continuous pattern round a square chamber is its adjustment at the corners. The way the Mitla artists solved this problem was by re-turning the pattern round the corners, as though he had taken a roll of matting and nailed it to the wall [fig. 9]. It was interesting for me to find that while three corners were thus successfully treated, the pattern did not come together at the fourth [fig. 10].

Mrs. Zelia Nuttall, who has made a special study of Mexican archæology, has pointed out



FIG. 9.—DETAILS OF THE CHAMBERS OF THE PATIO OF MOAICH, SHOWING THE RETURN OF THE PATTERNS ROUND THE CORNERS OF THE ROOMS.



FIG. 10.—EAST CHAMBER OF THE PATIO OF MOAICH, FOURTH CORNER PATTERN DEFECTIVE.

Photos by Charles Grove Johnson.

to me that the forms of all the Mitla designs resemble those employed in the primitive arts of basketry and rush-weaving. It is indeed remarkable how closely the designs of the modern native rush mats resemble the geometric patterns of Mitla. As Mrs. Nuttall remarked, the ancient custom of hanging mats on the walls may well have suggested the idea of reproducing this form of decoration in painted stonework. In this connection it is interesting to note that Francisco de Burgoa, a Dominican monk who visited Mitla in 1674, records that "all its halls were covered with mats and were very clean."

Having now given a general description of the ruins, I will proceed to describe in detail the method of construction and the materials employed.

Substructures.—As already mentioned, the platforms appear to have been pyramidal in section and are made of rubble stone laid in clay mortar. In some cases they were faced with



FIG. 11.—DETAIL SHOWING THE MOSAIC PATTERN CARVED ON THE SOLID LINTEL.

cut stone, in others merely plastered. In Group No. 2 these were evidently in two stages. The fact that there is no break in the stone plinth of the patio, which exists in perfect condition, proves that they were originally coalescent in their lower plane; their upper plane, however, must have been disconnected at the four corners, in order to afford entrance to the enclosure.

Stairways.—In Group No. 2 I traced the steps which led to the court from three of the outer corners of the platforms; on the fourth side their place is

occupied by the outlet of the drain, which has already been described and illustrated. These steps, like those which remain of the great stairway which led to the Hall of Monoliths, are remarkably steep and inconvenient. They are pyramidal in section, and their tread is so narrow that there is barely room to place the foot. They are not cut out of a solid block, but are formed of two flat stones about 0·12 m. thick, one of which forms the riser and the other the tread.

From the remaining steps which lead from the outside to the courtyard of Group No. 2 I am led to infer that entrance was obtained to the enclosure in the following peculiar manner. Access to the first stage of the platform having been gained from the outside at the corners, one had to walk along this plane to the centre of the terrace, where one encountered the great stairways. It is evident that by this means it would have been exceedingly easy to defend the entrances to the enclosed court in times of war, when the temples served as fortresses. Mrs. Zelia Nuttall has suggested that the peculiar steepness of the stairways may have been planned in order to render a hostile attack more difficult. In the history of the conquest there are many accounts of the disasters experienced by the Spaniards in scaling the precipitous steps of the Mexican temples.

Walls.—The stone used throughout the building is trachite, the ancient quarries of which have been discovered in the neighbouring hills.

The massive core of the walls of Mitla is made of rubble stone, imbedded in the adhesive clay of which the "adobes" or sun-dried bricks, extensively used in Mexico, are made. In the passage leading from the Hall of Monoliths to the Patio of Mosaics I found evidences that the coarse grass known as "zacaton" had been mixed with the clay in order to render it more binding.

In nearly all of the buildings the rubble core was faced with cut stone, which was carefully bonded and so closely fitted together that a penknife can hardly be inserted between the joints, in which, strange to say, there are no traces of mortar; yet the ancient builders well understood the art of mixing lime and sand to make mortar, although they appear only to have used it in the walls as a thin coating of plaster with which the whole surface of the stonework was covered and partially painted. Further proofs of their skill and knowledge in making mortar are their admirable pavements, which are as hard as modern cement, and appear in many places to have been coloured Indian red.

It was interesting to note in the great court of

Group No. 2 traces of guide-lines running from side to side, showing that the pavement was laid in sections of about one metre and a half wide. In one place I observed three successive layers of cement, each layer retaining its bright red surface, which leads to the inference that the pavement had been renewed at different times.

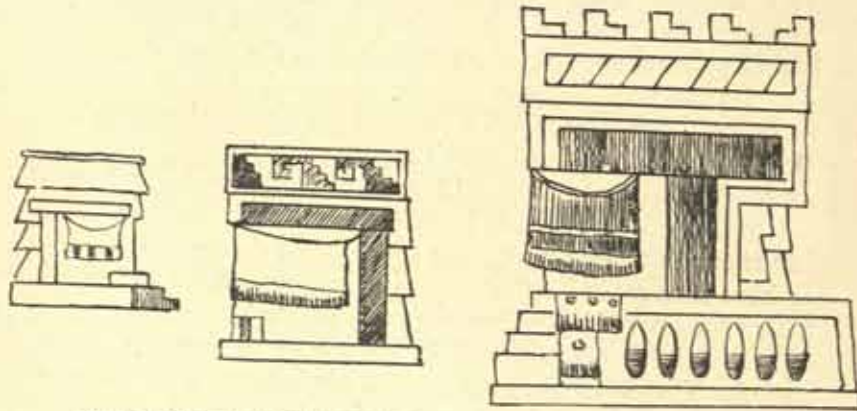


FIG. 12.—MANNER OF HANGING A CURTAIN BEFORE A DOOR, FROM THE MEXICAN CODICES

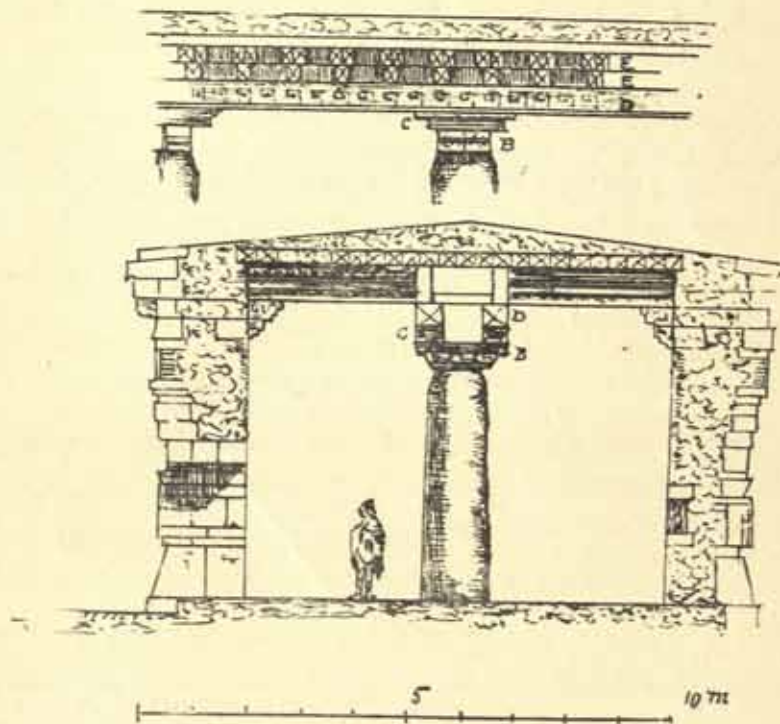


FIG. 13.—SECTION OF THE HALL OF MONOLITHS, AS RESTORED BY VIOLETT-LE-DUC, (*Antiquités Américaines*, p. 79.)

The interior walls of the Hall of Monoliths and other places where the stone face was omitted were finished with a coat of plaster.

Wall Painting.—The paintings on the stone lintels in Groups No. 1 and No. 4 have already been alluded to. There are proofs that at one time the whole of the beautiful stonework of Group No. 3 was painted, the background of the mosaics being red and the raised pattern white. Certain fragments of the painted plaster coating, which is very thin, show a highly polished surface, which almost gives the effect of oil paint.

Doorways.—We have already mentioned that the doorways are invariably spanned by monolithic lintels, of which I obtained the true section from the one lying in the courtyard of Group No. 3 [fig. 4]. All Spanish writers agree that doors were unknown to the ancient Mexicans. The native picture writings furnish illustrations of temples with hangings suspended across the doorways [fig. 12]. It is evident that the same method was employed at Mitla, for in the centre of each pier, about 1.60m. from the ground, there exist round holes which appear to have been made for the purpose of inserting the end of a pole or some contrivance to which a cord for stretching the hangings was attached.

The Roof.—Opinions differ greatly as to how the buildings of Mitla were originally roofed. Viollet-Le-Duc's conjectural reconstruction of the roof of the Hall of Monoliths is unquestionably fanciful and un-American in style [fig. 13].

The only authentic information we possess on the subject of prehistoric roofing is contained in the Mexican codices, illustrations from which have been furnished me by an archaeological friend [figs. 14 and 15]. These prove that some temples had high thatched roofs, while others were flat, presumably in the same style as the modern Mexican "azotea." The fact that rows of columns were placed down the centre of the Great Hall of Group No. 3 excludes, in my opinion, the supposition that they had thatched roofs; we may therefore surmise that the roofs were flat, but no remains of any sort exist to enable us to form an opinion as to the method of construction adopted.

It will be seen on referring to the ancient drawings of flat-roofed temples [fig. 14] that they usually display below the parapet a series of circles. These surely indicate the projecting poles which formed the ceiling joists, the round ends of which seem to have been allowed to project beyond the wall and to have been painted and decorated, on the sound principle of not constructing ornament but of decorating construction.

In a number of instances embattlements of different forms are shown as a finish to the building. Although no traces of them remain, it seems more than probable that similar indented parapets once surmounted the buildings of Mitla.

In connection with the pre-Columbian thatched roof, it is interesting to observe that its direct descendant is used at the present time in the little village of Mitla.

On examining the hut of which an illustration is given [fig. 16] I found that the principal rafters were formed of poles, round which purlins of cane were tied. This framework supported the thatch, which was made of the leaves of the same cane or native bamboo, and laced with thin cords of agave fibre.

A few words concerning the tools and standards of measurement which were employed in ancient Mexico may be of interest. In the neighbourhood of Mitla bronze chisels and axes, chipped flint and obsidian knives, and stone hammers have been unearthed, and we learn from native drawings and the Spanish historians that wood mallets were in common use. We must therefore conclude that the perfect masonry of Mitla was executed with these primitive instruments, to which may perhaps be added, in the case of great blocks of stone, the laborious process of cutting by means of cord made of agave fibre, used in combination with water and sand. In order to dress the face and edges of the stone the native work-

men must have ground one stone upon another, just as their descendants do at the present day.

The huge monoliths were probably raised on inclined planes by means of rollers, with great expenditure of human labour.

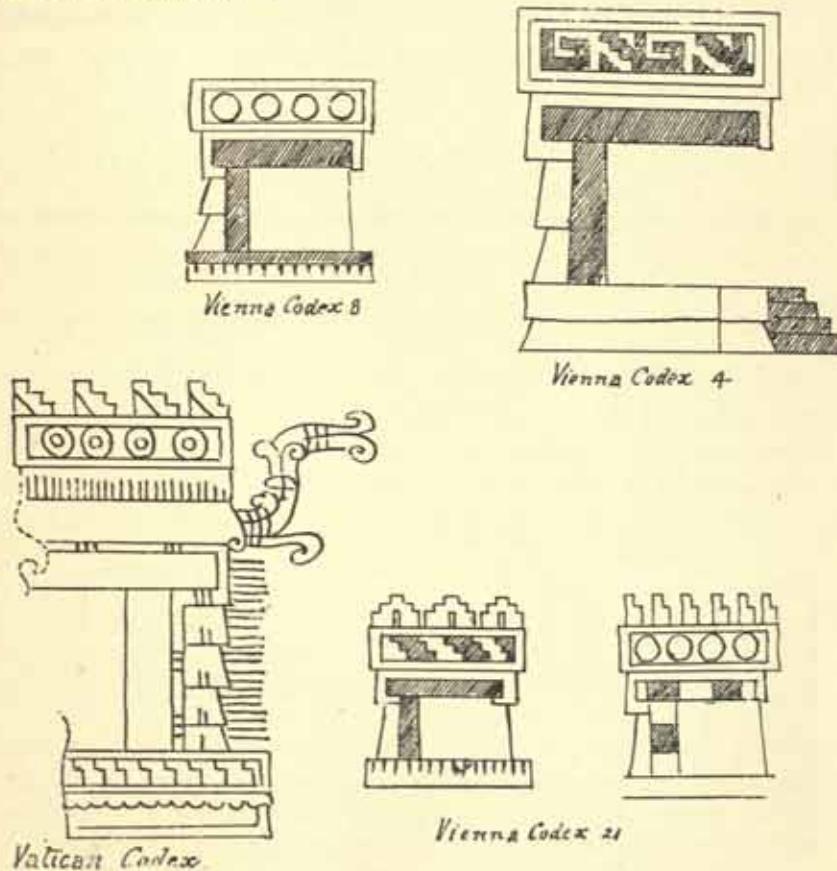


FIG. 14.—TEMPLES WITH FLAT ROOFS, FROM THE MEXICAN CODICES.

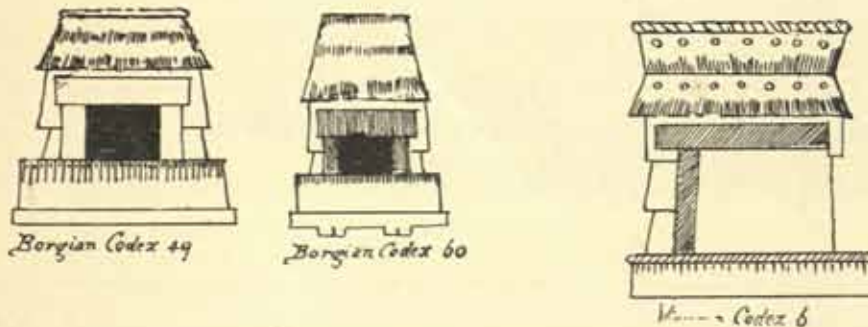


FIG. 15.—TEMPLES ROOFED WITH THATCH, FROM THE MEXICAN CODICES.

The following extract from Daniel G. Brenton's *Essays of an Americanist* shows that the ancient Mexicans were unacquainted with the use of the plumb line:—

“The plumb line must have been unknown to the Mexicans; they called it ‘Temetztepilolli,’ ‘the piece of lead which is hung from on high, from *temetzli*, lead, and *pilola*, to

fasten something high up.' Lead was not unknown to the Aztecs before the conquest. They did not esteem it of much value, and their first knowledge of it as a plummet must have been when they saw it in the hands of the Spaniards."

The codices show that cords, invariably stretched by two individuals, were used either for measurement or guide lines. As in the case of all primitive people, the Mexican standards of measurement were derived from parts of the human body. According to Brenton's authority, it was the foot measure that was adopted as the official and obligatory standard, both in commerce and architecture.

Instead of inferring, as some archæologists have done, that the marked asymmetry of all the Mitla buildings was intentional,* I am inclined to attribute it to a rudimentary knowledge of geometry. Considering that these primitive buildings did not succeed in setting out square a single court or chamber, it is all the more remarkable that they were able to execute with such perfection the complex geometric ornaments which constitute the most characteristic feature of Mitla architecture.

In conclusion, I will express the hope that the above observations on a building which is one of the best existing examples of prehistoric autochthonous American architecture may be of use, not only to architects, but to archæologists.

* C. Louis H. Ayme (quoted in "Notes on Mitla"), *Proceedings of the American Antiquarian Society*, April 1882.



FIG. 16.—MODERN THATCHED HUT IN THE VILLAGE OF MITLA.



9, CONDUIT STREET, LONDON, W., 24th Sept. 1904.

CHRONICLE.

British Museum Extension.

The correspondence which has passed between the Council of the Institute and His Majesty's Office of Works with reference to the proposed enlargement of the British Museum is printed herewith for the information of members:—

9, Conduit Street, W.: 3rd Nov. 1903.

To the Right Hon. Lord Windsor,

First Commissioner of His Majesty's Works.

MY LORD,—The attention of the Council of the Royal Institute has been drawn to the fact that very large works are in contemplation for the enlargement of the British Museum on a site recently acquired for that purpose.

We are directed by the Council respectfully to express to your Lordship their desire to urge strongly upon His Majesty's Government that the Architectural profession should be consulted in the case of a work of such national importance, as has usually been done in similar previous cases.—We have the honour to be, your Lordship's most obedient servants,

ALEXANDER GRAHAM, *Hon. Secretary*;
W. J. LOCKE, *Secretary*.

29th March 1904.

To Aston Webb, Esq., R.A., President R.I.B.A.

SIR,—I am directed by the First Commissioner of His Majesty's Works, &c., to inform you that he has had under careful consideration the representation of the Council of the Royal Institute of British Architects dated the 3rd November last with reference to the proposed enlargement of the British Museum.

I am to state that it has been decided to extend the accommodation of the Library and Reading Room of the Museum, and such extension is to be provided by a building on the north side with a frontage on Montague Place; and I am desired by Lord Windsor to lay before you and the Council of the Institute the following proposals of His Majesty's Government:—

The elevation of the building should form part of the design of one which will ultimately occupy the whole area of the ground enclosed by the present Museum on the south, Montague Street on the east, Montague Place on the north, and Bedford Square and Bloomsbury Street on the west, although the further completion of the building is not contemplated, nor is it likely to be required, for many years.

After fully considering the question the Government have decided to adopt the same method for the selection of an architect for this building as was followed in the recent case of the new Public Offices, and I am to enquire whether the Royal Institute of British Architects will be prepared, as in that instance, to assist the Government in obtaining a selection of the best architectural talent available by nominating a limited list of not less than six architects of taste, skill, and efficiency in classical design who would in their opinion be the best qualified to carry out a work of this importance.

It should be understood that the architect selected by the Government would be appointed subject to the condition that in the preparation of plans he would have to follow, in their internal arrangements, the lines laid down by this Department.

It is essential that the elevation should be designed generally in the same style as and should harmonise with Smirke's façade in Great Russell Street; but, subject to this condition, there is scope for some variation in the treatment, which would lend additional interest to the other three important frontages.

The building should be constructed externally entirely of Portland stone.

It is suggested that, as in the case of the former nomination of architects by the Institute, the list of nominees might conveniently be accompanied by a statement of the names of one or more of the most important of the buildings erected by each in the required style, together with any existing illustrations or photographs thereof.—I am, Sir, your obedient servant,

SCHOMBERG R. McDONNELL.

The Council, having given the most careful consideration to the important task the Government had entrusted to them, nominated seven architects,* illustrations of whose works were thereafter submitted to the Government.

Intimation of the Government's selection of Mr. J. J. Burnet to prepare plans for the proposed extension has been conveyed to the Council in the following letter:—

* The process of selection of these architects by the Council was explained by Professor Beresford Pite at the Annual General Meeting last May [JOURNAL, 7th May, p. 370].

17th August 1904.

SIR,—I am directed by the First Commissioner of His Majesty's Works, &c., to inform you that after a very careful consideration of the names of the architects which your Council were good enough to submit for their guidance, His Majesty's Government have selected Mr. J. J. Burnet to prepare plans for the proposed extension on the north side (with a frontage to Montague Place) of the British Museum.

This decision has been arrived at after a prolonged enquiry and after examination of the drawings and photographs forwarded by the Institute in support of the list of names submitted.

I am desired to express on behalf of the First Commissioner his gratitude to the President and Council of the Institute for the invaluable assistance they have afforded in enabling His Majesty's Government to arrive at a decision upon a matter involving much difficulty and responsibility.

I am to add that the drawings and photographs are being returned to the individual architects with a letter of thanks from the Board.—I am, Sir, your obedient servant,

The Secretary R.I.B.A.

J. FITZGERALD.

Seventh International Congress of Architects.

His Royal Highness the Prince of Wales has graciously signified his acceptance of the position of Honorary President of the Seventh International Congress of Architects to be held in London in 1906.

The Annual Dinner.

The Council have deemed it advisable to postpone the proposed visit and holding of the Annual Dinner of the Institute at Newcastle this year. All arrangements published in previous issues are consequently cancelled.

Sessional Papers 1904-5.

Arrangements are in progress for the reading of the following Papers at the Institute during the coming Session:—

Nov. 21.—Concrete, by L. G. Mouchel (agent for Hennebique's Patents); The Construction and Strength of Reinforced Concrete, by Wm. Dunn.

Dec. 19.—Architecture and Building Acts, by Lacy W. Ridge [F.] and James S. Gibson [F.].

Jan. 23.—European Architecture in India, by James Ransome [F.].

Feb. 20.—Architectural Education, by Reginald Blomfield, M.A.

March 20.—Decorative Painting, by Sir Wm. Richmond, K.C.B., R.A. [H.A.], and other artists.

April 3.—The Planning of Cities and Public Spaces, by John W. Simpson [F.]; The Architectural Improvement of London, by Professor Beresford Pite [F.].

April 17.—The Garden and its Accessories, by Mervyn Macartney, M.A.

May 15.—Sculpture and Architecture.

The A.A. Schools.

Mr. T. Frank Green [A.], master of the newly established Evening Continuation School of the Architectural Association, briefly sketches in the current *A.A. Notes* the work to be done in the classes under his supervision. The Continuation School has been started in order that students who have finished their two years' course may be able to continue their studies in the evening without a break.

The inauguration of this school (Mr. Green writes) will enable the master of the Day School to put into effect several changes which have been impracticable while the second year's study finished the course, so that more time may be given to making a solid foundation upon historical work and more consideration given to construction, some work now undertaken in the last terms of the second year being left over for the Continuation School.

The work of third-year students will consist of working out subjects in design somewhat in advance of their previous work, and special attention will be given to planning, both for convenience and architectural effect. The constructional and hygienic problems connected with each subject will also receive adequate attention, and, as far as possible, construction will be dealt with in connection with the designs worked out.

Perspective drawings will be made of the subjects designed, and the finishing of these in various media will be touched upon, since the importance of being able to make a drawing which will give accurate ideas of the finished building can hardly be over-estimated.

Subjects will be set involving the consideration of designing in mass rather than in detail, and small-scale sketches of large subjects will occasionally be given in order to impress upon students the prime importance of having an "idea" when designing. Students will also be directed to consider Building Acts, By-laws, &c.; design subjects being set to touch these matters with the view of enabling students in their fourth year to take full advantage of the lectures on these subjects.

The study of ornament will be combined with the drawing of it, and subjects in the design of ornament will occasionally be set. Time sketches of ornament will be required both to be drawn from the cast and designed, and students will not be confined to the use of other materials than "Whatman" and "Conté crayon." Short addresses will be given upon the work in hand and on other subjects whenever it is thought that these will be helpful.

In the fourth year more advanced subjects will be set for design. The study of colour as related to buildings will be commenced, and something more ambitious will be attempted in the preparation of working drawings and details. It is hoped that the curriculum may be made to include some instruction as to prices and the supervision of building work, the lectures on professional practice being open to students. The science of lighting, heating, ventilation, and sanitation will be dealt with in this year, the chemistry of building materials forming part of the course.

The writing of reports and descriptions of buildings will be practised, and, if time permits, specifications of one of the subjects set will be worked out in continuation of work of this nature done in the Day School. In both the third and fourth years particular attention will be given

to the study of "old work," which students are able to undertake outside the school, both during term and vacations.

Mr. Green points out that the Continuation School will in no way trench upon the evening classes and lectures now in existence, but will, by keeping past students of the Day School together, enable them, under the direction of the master, to take fuller advantage of these classes than would be possible if left to their own devices at the end of their second year.

Plenum Ventilation and Royal Victoria Hospital, Belfast.

The Editor has received a communication from Mr. Bibby in reply to the statement of Messrs. William Henman & Thomas Cooper and Messrs. Henry Lea & Son, which appeared in the issue of the 17th August. The Editor regrets that it is impracticable to insert this communication or a sufficient extract in the present issue of the JOURNAL, but the matter will receive attention in the next issue.

The Formation of Suburbs.

In a letter to *The Times* Mr. T. C. Horsfall, referring to an article in *The Times* on "The Formation of London Suburbs," points out that the care which ought to be taken to insure for London that its suburbs shall be not only healthy but slightly has long been taken for Berlin and other German towns by their authorities. From the point of view of care for the public health it is there regarded as a well-founded demand that the buildings of a large city shall continuously diminish in closeness as one leaves the centre, so that fresh air may pass from the country into the interior of the town with the least possible hindrance.

The building regulations for the suburbs of Berlin, which apply to a very large area, some parts of which are more than twenty miles from the centre of Berlin, limit the height of the buildings and the proportion of the sites which may be covered with building. Different heights and different degrees of closeness of building are allowed in different districts. In a few districts near the centre five stories are allowed. In other large districts only detached or semi-detached houses, not exceeding three stories in height, are permitted. On the west side of the town, the side from which the prevalent winds blow, a larger proportion of the area is reserved for "open" building than elsewhere.

All large German towns, and some towns which are not large, prepare building plans to regulate the growth of their suburbs. These plans provide that the principal streets shall be very wide and that some of them shall be planted with trees, that there shall be a good many planted open spaces, and that some parts of the suburbs shall contain only detached and semi-detached houses.

It is considered desirable that the building plan for a town shall show how all the land which is likely to be needed for the next ten or twenty years is to be laid out. Many books dealing with the subject of town extension plans have been published of late years in Germany. The pioneer book was "Stadt-Erweiterungen," by Professor R. Baumeister, of Karlsruhe, which was published in 1876, and is still regarded as a standard work.

REVIEWS.

PHYLAKOPI.

Excavations at Phylakopi. Conducted by the British School at Athens. 280 pages, with 41 plates and 193 illustrations in the text. Published by the Society for the Promotion of Hellenic Studies. Price 30s. net. [Macmillan & Co., Ltd.]

This volume is published as Supplementary Paper No. 4, and embodies the results of the excavations 1896-1899 described in a series of papers as follows: "Introduction" and "Bronze Statuette," by Cecil Smith; "The Excavation," by D. G. Hogarth; "The Architecture," by T. D. Atkinson; "The Obsidian Trade" and "Wall Painting," by R. C. Bosanquet; "Minor Antiquities," by R. C. Bosanquet and F. B. Welsh; "The Pottery," by C. C. Edgar; "Pottery Marks," by A. J. Evans; "The Successive Settlements of Phylakopi," by D. Mackenzie. Drawings by T. D. Atkinson, Halvor Bagge, E. Gilliéron, and T. D. Fyfe. The text is fully illustrated by drawings and photos, and the plates include two excellent plans in colour, showing the first, second, and third period cities as far as have been recovered.

The site of Phylakopi faced the sea to the north, and "stood on a small hillock of limestone with low land to the west, east, and south; on the south-west it was connected by a ridge with high ground further inland. The sea has encroached considerably on the land, and has evidently carried away a large part of the town. The town may have been on the coast, or possibly it was some little distance inland." "Our city appears to have measured about 240 yards from east to west" (J. D. Atkinson, p. 23). Remains of a great fortified wall were found at the westernmost angle of the site, commencing at the sea and extending for a distance of about 230 feet eastwards, protecting the town at a point where the natural configuration of the ground made it comparatively easy of attack. Efforts to trace this wall further eastwards proved fruitless. Some room for discussion evidently exists as to the physical characteristics of the site at the time of its occupation, as Mr. Hogarth (p. 9), referring to the operations in 1898, undertaken to determine the direction of the fortification eastwards, tells that no evidence of a city wall was found at the eastern limit of the

excavated area of the site. "Perhaps this lower eastern half of the town stood less in need of strong mural defence. This supposition can only be justified on the theory that the low fields to the south and east are ancient sea lagoons, dried through the gradual creation of the barrier beach of boulders which now fends off the sea." "The argument which I used in the Preliminary Report (B.S.A. IV. pp. 7, 8), that only on that theory could a sufficient harbour be found for this obsidian exporting centre in early times, is a strong one, and would be conclusive if so much sea-erosion had not taken place (*e.g.* on the west of the town) that the original coast line cannot now be known. The matter cannot at present be lifted out of the region of conjecture."

The great importance of these excavations is told in Mr. Mackenzie's "Introductory" (p. 238): "Since the excavations of the British School at Phylakopi in Melos were brought to a provisional conclusion in 1899, considerable progress has been made in archaeological discovery relative to the Prehistoric Age not only in the Cyclades but further afield in Crete. Thus for the Cyclades the important recent explorations carried on by Mr. Tsountas in Amorgos, Paros, Siphnos, and Syros have considerably enlarged our knowledge of the early Cycladic Civilisation which is represented in Melos in the earliest strata of Phylakopi."

"In Crete, again, the remarkable results of the excavations at Cnossos (1900-03) have to be mentioned. Further, we have to notice the important work of the Italian Mission at Phaistos (1900-03), and at Hagia Triada (1902-03), while the British School has also itself taken its full share in archaeological discovery in Crete, as at Cnossos and Dicte (1900), Zakro (1901), and Palaikastro (1902-03). Finally, we must not forget the interesting results of the excavations of the American Mission at the Minoan site of Gournia (1901-03).

"At Cnossos, in particular, the range of discovery covered a very wide field, extending from a remote prehistoric era, as yet unrepresented in the results of any discoveries in the Aegean, through a period which has to be correlated with the earliest yet known of in the Cyclades (that represented in the cist cemeteries), to a time when apparently, equally in Crete and in the Cyclades, the Aegean civilisation had reached its prime. Finally, at Cnossos, at Phaistos, and at Hagia Triada, we have, equally with Phylakopi, the completion of the story in evidence of a decadence to which no later renewal of life was ever destined to succeed.

"Meanwhile, discoveries in the mainland of Greece, in Italy, particularly Sicily, and in Egypt, have been extending the possibilities of comparative reference in a wider context. In this connection it is of special importance that the results of the great discoveries made by Schliemann and Dörpfeld at Hissarlik are now available for com-

parison since the appearance of the monumental work on Troy.

"In view of discoveries like those to which reference has been made, an idea of the importance of the work carried out by the British School in Melos may be gained from the fact that, notwithstanding later discoveries in the Cyclades, Phylakopi still remains, outside Crete, the most important prehistoric site in the Aegean. Indeed, the results of exploration in other islands go to show that Phylakopi will probably remain for a long time, if not always, the typical prehistoric site in the Cyclades. It is the only one yet discovered that exhibits the Cycladic civilisation in all the outstanding phases of its development from the earliest beginnings to the era of the decline."

Before the British Association Dr. Evans gave an address on a preliminary scheme for the classification and approximate chronology of the periods of Minoan culture in Crete from the close of the Neolithic to the Early Iron Age. He held that Mycenaean culture was in its main features merely a late and subsidiary outgrowth of the great Minoan style, when the fine motives of the Late Palace period were already seen in a state of decadence. He divides the Minoan Era into three main periods—Early, Middle, and Late—each with a first, second, and third sub-period. The Late Minoan period from 1700 B.C. to 1100 B.C. The Middle Minoan Age is thrown back to the third millennium B.C. The Early Minoan period middle of fourth millennium B.C. (See R.I.B.A. JOURNAL, August 1904.) As this has been only recently published, the classification may affect somewhat the term Mycenaean as used in this work.

Little of architectural value has been unearthed, and there is no evidence of the existence of any style whatever in the buildings of any of the three settlements whose plans are given and described by Mr. Atkinson. Several more or less complete plans of houses show the general arrangement to have been that of a group of two, three, or four small cells, connected together and entering off one another. Fig. 26 seems to indicate an attempt to give importance to the entrance hall of the house. Fig. 32 shows a house of the second period in which a corridor has been introduced. The lack of steps suggests that they were either of one story or that the stairs were in wood; and, considering the evident lack of masonic skill, the latter theory may carry weight. The only building of any great proportion is the Palace, the foundation plan of which has been recovered. This building belongs to the period of the third settlement, and is interesting as showing the arrangement of the homes of the great as compared with the homes of the common people. Here importance is given by an irregularly shaped courtyard, with a well, and a portico through which the Megaron is reached, but the want of any indication of doors prevents an opinion being formed as to how far the flanking corridors were utilised for

access to the other chambers. The absence of any architectural detail is disappointing. The careless manner in which the building angles have been set out and the irregularity of the extremely narrow alleys do not indicate any guiding rules in the execution of the work. The architecture does not supply any conclusive evidence as to the degree of continuity of the occupation of the town, as the work in all three periods is similar; the rebuilding of each city has been gradual, and seems to have been carried out in a casual and independent manner. No fortification earlier than the period of the second settlement was found, showing that the first settlement was an open town similar to the Minoan cities of Crete. Mr. Atkinson divides the architectural section into three parts—first period (pre-Mycenaean), second period, third period. Of the first period, the remains found were scanty, but the second and third periods have yielded sufficient to enable the streets and houses to be defined, although the proportion of open space to covered area is not clear. The few examples of complete doorways—which Mr. Atkinson suggests were provided with heavy wood frames to support the wall over—show no sign of constructive skill. Walls generally were 2 feet thick, and a style of building with large blocks of basalt headers and thin slabs of limestone stretchers alternately has in some places been used, whether for practical or artistic reasons is not quite certain. Knowing the prevailing horizontal "frieze" treatment in the pottery decoration, it is not unlikely that this surface decoration was inspired by the same motive.

The feeling for surface decoration is again strongly in evidence in the remains of wall paintings described by Mr. Bosanquet, but these show a highly developed phase of decorative art far in advance of any constructive decoration found. The flying fish frieze, discovered in the remains of the second city, is the best example of this section; in colour, composition, and drawing it is the work of a master, and the "slickness" and "go" of it are truly amazing among buildings of such a character. This beautiful little fragment of Mycenaean art measures 23 cm. high, and is a portion of a continuous frieze on a pale yellow ground framed in black borders, separated from the picture by a line impressed in the wet plaster. On the yellow ground are drawn flying fishes, described by Mr. Bosanquet (p. 70). "The composition at the left-hand end began with a fish swooping downward to the right; the space below and to the left is filled by a mass of conventional rocks that limit the whole picture above and below." "The same fish are repeated again and again, darting upwards or downwards with wings now closed now outspread; above and below them a fantastic rocky wall clothed with sponges and sea-eggs. But it is not the mechanical repetition of a stencil pattern; the draughtsman knew how to vary his design in detail without interrupting the

rhythmic movement that ran from end to end of it. The general effect of the delicate colouring and lifelike drawing is singularly like that of Japanese paintings of birds and fish." Indeed, as I write, I have before me a reproduction from a Japanese print, the technique and composition of which show identical feeling. A parallel to this fragment was found by Mr. Evans at Cnossos so strongly resembling it that it can safely be claimed as a product of Cretan art. Either imported complete or the work of an imported artist, Mr. Bosanquet thinks it improbable that the remains of this and the other wall paintings found belonged to the earliest days of the city, but that they "belong to the period during which the dominant influence at Phylakopi came from Crete, not from the mainland." The technique is not in true fresco, but in a combination of fresco and tempera.

The chief interest and value of the excavation is centred in the pottery, which has been found in a great unbroken range from the period preceding the first city to the latest period of the third settlement, when native pottery was displaced by imported ware.

Mr. Edgar (p. 80) writes: "From few Aegean sites of the pre-Hellenic period, if indeed from any, has there come a more interesting collection of pottery than from Phylakopi in Melos. The find ranges without any apparent break from the earliest types of the Cyclades to specimens of the latest Mycenaean style. It is true that the earlier period up to the introduction of ware with painted patterns is very imperfectly represented owing to the shattered condition of the material." "But in two respects the Phylakopi find is of capital importance: first, it provides us with an ordered series of pottery extending, we may venture to say, over the whole Bronze Age of the Cyclades; and, secondly, it exemplifies with remarkable fulness the geometric and the Early Mycenaean styles of vase painting as practised in one thriving centre of industry."

Mr. Edgar divides the pottery into four main groups, "shading off into each other, and each of them capable of further subdivision. These are as follows:—

- I. (a) The more primitive pottery of the cist-tomb class (Sect. 2).
- (b) The more advanced ware (Sects. 3 and 4).
- II. Painted geometric pottery.
- III. Local pottery in the Mycenaean style with spiral and naturalistic designs, early period and late period.
- IV. Imported Mycenaean pottery.

"The history of the pottery and that of the buildings cannot be correlated with perfect precision, or, at least, I cannot do it, and probably no one that has seen the site would expect it."

Group No. 1 is similar to the pottery found in the primitive cist tombs of the Greek islands. It was found in a layer immediately above the bed rock and belongs to an occupation anterior to the earliest buildings discovered. "The pottery was

hand-made of very coarse, imperfectly baked clay, usually with a burnished surface, red or brown." On account of the fragmentary nature of the Phylakopi finds, the illustrations are from "similar examples from the neighbouring cemetery of Pelos."

Section III. was found in conjunction with the earlier ware, but certainly originated later and was used later. Its shattered state only allows of a description of a few of its characteristics—decoration of impressed patterns, geometric schemes. Most of them bear traces of a coat of black glaze, and sometimes a coat of red or brown glaze. The smaller ware was of fine clay, with sometimes a polished surface. Painted design was found in lustrous paint and many fragments were glazed inside. Section No. 4 was more plentiful and has a lustrous surface, red, brown, or black, and, with some exceptions, the lustre is not produced by burnishing but by some ingredient in the coat. In addition, incised patterns are used sometimes with white filling. This technique is a "prominent feature in the earliest pottery of Egypt, Anatolia, and Europe." The simple forms of these pieces lend themselves to the equally simple lines of the decoration, which, in spite of its simplicity, is used in endless variety, and applied generally in a horizontal motive, its application being varied in sympathy with the form of the pot. (On page 90, last line, read V. 11 and V. 8 for IV. 11 and IV. 8, and on page 91 read V. 8 a, b, c for IV. 8 a, b, c.) "The practice of decorating pottery with a lustrous monochrome coat was in constant use throughout the whole period covered by the Phylakopi finds." The designs of the painted ware of the geometric pre-Mycenean period were applied in three different methods: 1. Lustrous black on white slip surface; 2. Powdery mat black, of uniform dead blackness, upon a white slip; 3. Surface covered with lustrous coat of black or red and design painted on in white. These three methods were contemporary. As to the exact order of their origin, some difference of opinion seems to exist. In the later phases of this period a tendency to greater freedom in design is noticeable, and representations of garlands or necklaces occur with geometric patterns. This change is of gradual evolution, and there is no distinct line of demarcation between geometric and floral motives. The influence of the earlier incised period is noticed in the brush stippled lozenges and circles in imitation of impressed patterns.

The great variety of beautiful forms of these vases is well illustrated in the plates and drawings, which are well worth the study of students of structural form and the planning of decorative motive as applied to form. In the later phase of this group the increasing fondness for curvilinear treatment is noticeable.

In the pottery of the Mycenean period freedom in design continues, and birds, fishes, and fantastic

subjects are introduced, and naturalistic floral motives are also common. Fig. 114 shows a decided Egyptian influence. The fisherman vase is a "most remarkable piece of painted earthenware": the decoration consists of four figures of men with a fish in each hand, painted in black outline with red filling; the vigorous drawing of the legs is curiously inconsistent with that of the arms and body, and the great eye stuck in the cheek seems to call for some explanation. Figs. 96 and 97 are most beautiful examples of floral decoration, in which natural forms are preserved and planned in a free and decorative manner. Some examples of the later Mycenean ware show a free mingling of scrolls and floral design, in which a tendency to restraint is in evidence, and are interesting in comparison with figs. 96 and 97. Fig. 112 is an interesting vessel, evidently used as a bath, and numerous fragments of the same class were discovered. It is elliptical in form, and, from the rather vague idea of scale given, it seems to have been about 3 ft. 9 in. wide in its greater axis.

The latest group, called "Imported Mycenean" pottery, shows characteristics which are quite different from the local ware; the new technique is introduced in developed form. Mr. Edgar writes (p. 146): "We cannot therefore admit that any of the pottery under discussion is of Melian manufacture, except on the assumption that the new technique was introduced from abroad in a perfected form, and that an alien style was imported along with it, which remained entirely independent of the old established local style. The alternative conclusion—the truth of which is taken for granted throughout this article—is that with increasing importation of superior ware the local school gradually declined, until finally all the better painted pottery used in the settlement was brought from elsewhere and nothing was made on the spot except the most ordinary household vessels."

The recent excavations at Crete favour the assumption that it was the centre of manufacture of this mature technique. The evidence of the pottery shows that previous to the "Imported ware period" the potter's art flourished in Melos with all the receptive power and creative impulse of a living art, taking unto itself all with which it came in contact and "recasting" it with a character which was its own, using that influence brought by the wide commercial relationship of the obsidian trade as an active element subordinate to local tradition and individuality. The results of the excavations at Phylakopi and even at Cnossos bear witness to a power of artistic expression which had no comparative expansion in the wider realms of monumental grandeur.

Some examples, as at Plate XXXI. 1, show a most beautiful and perfected style of decoration, and many other fragments of this period are remarkable examples of technique and design.

An interesting series of mat impressions are illustrated in Plate VI. from the bases of some of the pots, which are valuable in showing to some extent the nature of the weaving industry.

Mr. Bosanquet's paper on the obsidian trade gives interesting facts to prove that it was responsible, in great measure, for the prosperity of Phylakopi, and that the subsequent decline of the trade was followed by the abandonment of the settlement.

"The volcanic glass called obsidian has been used in many parts of the world as a material for knives, arrow-heads, and other implements. Melos, being the principal, if not the only, source from which this useful substance could be obtained by the people of the Ægean, seems from very early days to have had commercial relations, not only with the neighbouring islands and the Greek mainland, but with the coast of Asia Minor, and even with Egypt. This regular intercourse and the prosperity resulting from it must have done much to foster the vigorous local civilisation revealed by the excavations at Phylakopi."

Mr. Mackenzie closes his paper with the following: "All the evidence, then, encourages us to conceive the Minoan sea power as a sort of Ægean League, that in the earliest phases of its history may have grown by successive acts of forced absorption into the sphere of influence of the League, but was ultimately established, as was inevitable in the case of island societies, through the sanction of voluntary incorporation, on friendly lines of mutual advantage based on internal economy. Of this Ægean League the finds now indicate that Melos must have been one of the most important members outside Crete.

"We have also seen that the Ægean civilisation, after a long course of development, reached its prime in Crete in the early days of the palaces at Cnossos and at Phaestos, and in Melos in the period of the late second and early and middle third cities at Phylakopi. Thus, if we can take Melos as typical of the probable course of development in other islands, the trend of that civilisation was towards one great period of prosperity which in greater or less degree was a uniform phenomenon all over the Ægean region. But the tendency towards decadence rested upon inner causes, which equally had their operative effect upon the civilisation as a whole. Besides these, however, as we have seen reason to conjecture, there were external causes contributory to the general process of decline which are not to be sought in any one part of the Ægean itself but on the mainland of Greece. The final catastrophe, when it came, was one which submerged the Minoan civilisation of Crete equally with that of Melos, and the final dissolution of the Ægean League and of the hegemony of Minoan Crete was one event with the break-up of the Ægean civilisation as a whole."

ARCH. C. DICKIE.

TAKING OUT QUANTITIES.

Quantity Surveying, for the Use of Surveyors, Architects, Engineers, and Builders. By J. Leaning. Fifth Edition, revised and enlarged. 8s. Lond. 1904. Price 25s. net. [K. and F. N. Spon, Ltd., 125, Strand.]

Although it is now many years since I had to deal personally with "taking out quantities," my interest in that most valuable adjunct to the profession of an architect has lost none of its freshness; and I am of the opinion, shared by many of my professional brethren, that an architect's education is not complete unless it is accompanied by a knowledge of "quantities," the acquisition of which is alike useful to the architect, a protection to his employer, and a check upon the occasional avarice of the builder.

Mr. J. Leaning is well known as a quantity surveyor, and a book by him upon the subject is bound to be well received, particularly when, as in the bulky volume before me, it has reached a fifth edition. The book is described to be for the use of "surveyors, architects, engineers, and builders"; but it appears to me that some of the information given would be better described as for *beginners*. Such elementary items as squaring dimensions and abstracting could well have been omitted in such a book as this, and perhaps more attention paid to other items of detail. For example, on pp. 7 and 53, the level at which digging for trenches, underpinning, &c., commences should be stated; on p. 69—a bricklayer's bill—"brickwork in filling in of openings, including extra labour and materials, cutting and bonding to old"—is taken at *per rod*; but all bonding and drawing toothings should be measured separately, as they may materially affect the price per rod—occasionally one rod may take ten times as much bonding as another. I do not agree with Mr. Leaning (p. 88) that the labour of cutting and pinning ends of timber or stone is about equal to building in; the ends built in must be far cheaper than cutting and pinning.

On p. 184, window linings are billed at per foot superficial; but it is better practice to measure them at per foot run, as the quantity of tonguing and angles is affected by the width. On p. 233, Mr. Leaning has omitted to state that the *weight* of copper should be given. On p. 251 the bill of girders, &c., suggests that the "depths" govern the price. They do to a certain extent, but not for the sections stated; and no mention is made of the width of flanges, an important factor when they are wide. The clause on p. 331 for "taking up or undoing any portion of the work" should have added to it "and making good after same." The paragraph on p. 384, referring to reducing cost of building by reducing its length, should have been more carefully drawn, there being a number of items in the tender not affected by the reduction in length of building, such as stairs, sanitary works, &c. The suggested clause on p. 428, that "no allowance

will be made for loss of profit on omitted work," is unfair to the builder, as he may tender for £10,000 worth of work, and be compelled to execute £2,000 worth at the same rate.

The portions of the book devoted to "prices," "arbitration," and the "law as it affects quantity surveyors" are exceedingly useful, and altogether the work is one which reflects credit upon Mr. Leaning, not only for its general usefulness, but for the patience and time which must have been consumed in its production.

In any future edition Mr. Leaning might with advantage endeavour to enforce the desirability of more *uniformity* in practice; we all know that the methods of some quantity surveyors do not coincide with those of others, and builders must at times be sorely troubled to price many of the slipshod productions termed "Bills of Quantities." The work of the quantity surveyor who thoroughly knows his business is well entitled to praise from all concerned; it saves much trouble and litigation in the end, and deserves full and adequate remuneration. Architects would do well to decline to support the wretched apologies for "quantities" frequently sent to the builders' offices; and qualified quantity surveyors should not be parties to the degrading terms frequently offered them for their work—work demanding scientific building knowledge, severe application, and personal sound judgment and discretion.

WM. WOODWARD.

AMERICAN ARCHITECTURE.

American Renaissance: A Review of Domestic Architecture illustrated by ninety-six half-tone plates. By John Wheeler Don, Architect. 4to. New York, 1904. Price 17s. in London. [B. T. Batsford, 94, High Holborn.]

This is a volume of attractive appearance, and its wealth of excellently reproduced illustrations, some hundred or so in number and all possessing a certain amount of interest, compels more than passing attention. The binding, too, is artistic, and the text is printed with the wide margins beloved of literary connoisseurs; but, unfortunately for the enjoyment of the English reader, the American spread eagle, which is emblazoned in gold on the cover, appears, invisibly it is true, but none the less insistently, on nearly every page. Frankly this is a book by an American architect written for his countrymen, and one is reminded that though art has a common language it speaks in many dialects, each possessing its own individual slang which only the native can fully understand. Hence the English reviewer finds it difficult to appreciate the author's treatment at its intrinsic value, while it seems hopeless to deal adequately with his subject in the few paragraphs of a review when in his opening words he speaks of the "impossibility of doing justice to its magnificence, even in its domestic phase, within the limits of a single volume."

The fact that the book is a *réchauffé* of magazine articles, which the author assures us excited sufficient interest to justify reproduction, need not militate against its claim for a permanent place on the book-shelf of the American professional or layman who wishes to possess a reference book on the history of the Renaissance in his own country. The reflections on art—or architecture rather—will also no doubt appeal with novelty to the American whom the stress of existence has prevented keeping posted with the modern English literature on the subject, but the strictures on Ruskin, "that old fogey," Browning, and others will hardly serve to commend the author's criticisms to the average English reader.

To some of the author's opinions no exception can be taken, as, for example, his opening premise that just so much as domestic architecture departs in an impersonal artificial way from whatever relates to or reflects the associations connected with the institutions of home life, so far it fails. According to our author the home one builds must presuppose, by subtle architectonic expression, that its owner possessed forebears and has inherited heirlooms; and even if this be not the case, for the sake of obtaining the necessary atmosphere we should imagine that such have come down to us with all their associations. "With such preparation," he continues, "it should be possible for every cultivated American to approach the subject of American Renaissance in the true spirit of understanding." We seem to be not unfamiliar with axioms of this kind, and to have met them expressed with more of literary charm.

The author is on less didactic ground when he points out that the American Renaissance differs from the same style in many countries of the Old World in that it has found its expression in wood, the most available material; and we agree with him that the copying of the earlier timber forms in the marble and stone of later and more prosperous times has resulted in the loss of that indefinable charm possessed by the early colonial domestic buildings. Whether this early charm is really indefinable, and whether it may not be expressed in the single word "simplicity," may be matter of opinion; but certainly, judging from the illustrations, it is evident that as the early simple type gives place to the later "Scaramouche"—to use the author's word—so the charm vanishes and the specimens shown become rather examples to be avoided than models to be imitated.

Passing on from the Introduction, we encounter the difficulty of understanding just to which class of his countrymen the author is more particularly addressing himself. If to his brother professionals, it is perhaps somewhat indiscreet to advertise the fact that, in his opinion, very few modern architects are able to give the home feeling which every dwelling-house should possess, and that as a body they build by the cubic foot alone; while if he is

anxious to appeal to possible clients, it is surely equally unwise to refer to them as a class capable of deeming the architect "plumb crazy" who would submit them a house really suited to their needs, and whose only requirement is that every dollar should be made to show. If this is a fair description of the typical American architect and client there would seem to be little hope for the evolution of a worthy architectural American style. Certainly the author admits that he prefers to "score his points" with sarcasm rather than flattery, though this idiosyncrasy is sufficiently obvious to need attention being drawn to it. But sarcasm is a two-edged sword, and its wielder might be well advised to abstain from showing his own solution of problems—e.g. the adaptation of the French Château, Plate LXXVIII.—which he implies that his brother professionals are unequal to solving. As to the taste, judged by English standards, of the author who can say, even sarcastically, "I suppose an occasional architect is annoyed past endurance by somebody who comes with an illustration of a particular piece of my work which has appeared in the magazine requesting that my style be copied," we prefer to express no opinion.

The book, as we have said and have endeavoured to show, is so obviously addressed to an American audience, to whom its historical elements should appeal, and on whom its peculiarities might not grate, that we should not have deemed it necessary to have referred to it, even at the present length, were it not that a casual glance at its illustrations might tempt an English student to the extravagance of adding it to his modest library. Were he to do so, we fear he would find that it occupied space which might be more usefully filled. We should prefer to describe it as a book adapted, as the author says of Ruskin's *Sesame and Lilies*, to be taken up from the drawing-room table when one has time to kill. H. A. SATCHELL.

WROUGHT IRONWORK.

English and Scottish Wrought Ironwork: A Series of Examples of English Ironwork of the best Periods, together with most of the Examples now existing in Scotland, with Descriptive Text. By Bailey Scott Murphy, Architect. Sixty-eight Plates of Measured Drawings, supplemented by seventy-two Collotype Reproductions of Photographs. Imp. fol. Lond. 1904. Price £3. 3s. net. [B. T. Batsford, 94, High Holborn.]

The volume by Mr. Bailey Scott Murphy has added one more to the now lengthening list of works on the Renaissance period in England, which up to the last few years had been so much neglected. Now that one or two large works dealing with the period generally have appeared, the amplification by studies of works in the different materials is still more interesting and valuable, and it would almost appear that the English work alone would have given the author ample scope.

However, this book, including the work of both countries, gives a varied selection, though this, perhaps, might have been carried further with advantage by devoting fewer plates to the ironwork of the two houses Belton and Drayton, which alone account for 27 plates out of the 80. The drawings are boldly executed, perhaps a little too boldly for the smaller scale reproductions, which do not look so well as the details, where everything comes out very clearly, and the fully figured dimensions of the parts are most useful. The studies of the iron balustrading to the stone steps at Drayton are helpful. A satisfactory combination of these materials is always a difficult problem.

Of the various gates shown, that to the gravel court is no doubt the finest example. The side gates are especially happy, but those to the east avenue, though quaint, seem decidedly poor both in execution and design, and might well have made way for another example of English work. The ironwork at Belton, which is exhaustively portrayed, is nicely balanced and charming in detail. The standards in the railings to the main avenue, shown on plate 23, and the ramps to the piers are well worthy of notice, being effective but of sober design. The charming examples of college gateways from Cambridge are too well known to need comment: what always strikes one in studying them is the advantageous set-off that they get from stone piers as against those not thus flanked, and constructed throughout in the lighter material. Oxford, too, is a mine of wealth for wrought ironwork, and Mr. Murphy shows us some fine examples. The Clarendon gates are beautiful pieces of work: they show, perhaps, to better effect in the photograph than in the drawing; the wide hatching of the solids and the absolute black of the narrow ribs detract from an otherwise careful drawing.

On plate 52 we get two examples of early work in the gate to Bishop West's Chapel at Ely and the grille at Winchester Cathedral, both of a Gothic character, and showing a fine contrast in the different ways of obtaining a good effect—the earlier example by repetition of one detail, and the other by variation in ornament. From Hampton Court, of course, some examples are drawn, and it is to be regretted that the author did not give us some measured detail of Jean Tijon's magnificent gates on the east front as well as the rails to the two great stairs.

The last few plates on the English work show a collection of lamp brackets, signs, tomb-rails, &c., all of which are full of interest, some—such as the lamp brackets from York [plate 65], and the sign of the bell from Melksham [plate 64]—being particularly charming examples.

The Scottish examples certainly bear out Mr. Murphy's contention of their inferiority to the English work; but they show an entirely different character, and make for more naturalistic forms, of

which rose, thistle, and oak, as used on the staircase at Caroline Park House, are good examples. It is certainly very interesting to compare the types from the two countries: though the Scottish work is much poorer than that south of the Tweed, it is full of suggestion, especially in its freedom of detail.

HENRY TANNER, JUN.

LIGHTING SCHOOLROOMS.

The Lighting of Schoolrooms: A Manual for School Boards, Architects, Superintendents, and Teachers. By Stuart H. Rowe, Ph.D. 80. Lond. 1904. Price 3s. 6d. net. [Longmans, Green & Co., Paternoster Row.]

This treatise, the work of an American, will be found a useful book of reference to those members of the profession called upon to carry out school work, and especially school enlargements, and buildings within the area of our cities.

There is little in Mr. Rowe's work which the expert planner on this side is not already acquainted with. However, even the expert may be able to learn something from Mr. Rowe, and especially from a perusal of the chapters dealing with selection of site, remodelling old buildings, and testing the sight.

The work is published by Messrs. Longmans & Co., and can be obtained for the moderate outlay of 8s. 6d.

ARTHUR H. RYAN-TENISON.

ALLIED SOCIETIES.

GLASGOW INSTITUTE.

Educational Facilities for Young Architects.

The Glasgow Institute of Architects is closely identified with the recently established School of Architecture in Glasgow, which is to hold its classes in the School of Art and the Technical College. The President of the Glasgow Institute, Mr. John Keppie [F.], has been elected a Governor of the School of Art, and associated with him on the Governing Body of the School are three other Fellows of the R.I.B.A., all Past-Presidents of the Glasgow Institute.

By a recent enactment of the Court of Session, made on the application of the Governors of the Technical College, the Glasgow Institute of Architects was empowered to elect a representative on the Governing Body of the College. The Institute has appointed one of its Past-Presidents, a Fellow of the Royal Institute, to be its representative, and with him is associated another member of the Institute.

At a conference of the representatives of the School of Art and the Technical College, held on 11th March 1904, a curriculum for a course for a

Joint Diploma in Architecture was approved of. At this conference also a course of study in Day Classes, extending over three years, and a similar programme of studies in Day and Evening Classes, to occupy a period of five years, were arranged. It was further agreed that candidates who have satisfactorily attended either of the courses of instruction or of such modifications of those courses as will be published later will be eligible for the Joint Diploma in Architecture of the School of Art and the Technical College after satisfying the Examiners appointed by the two institutions.

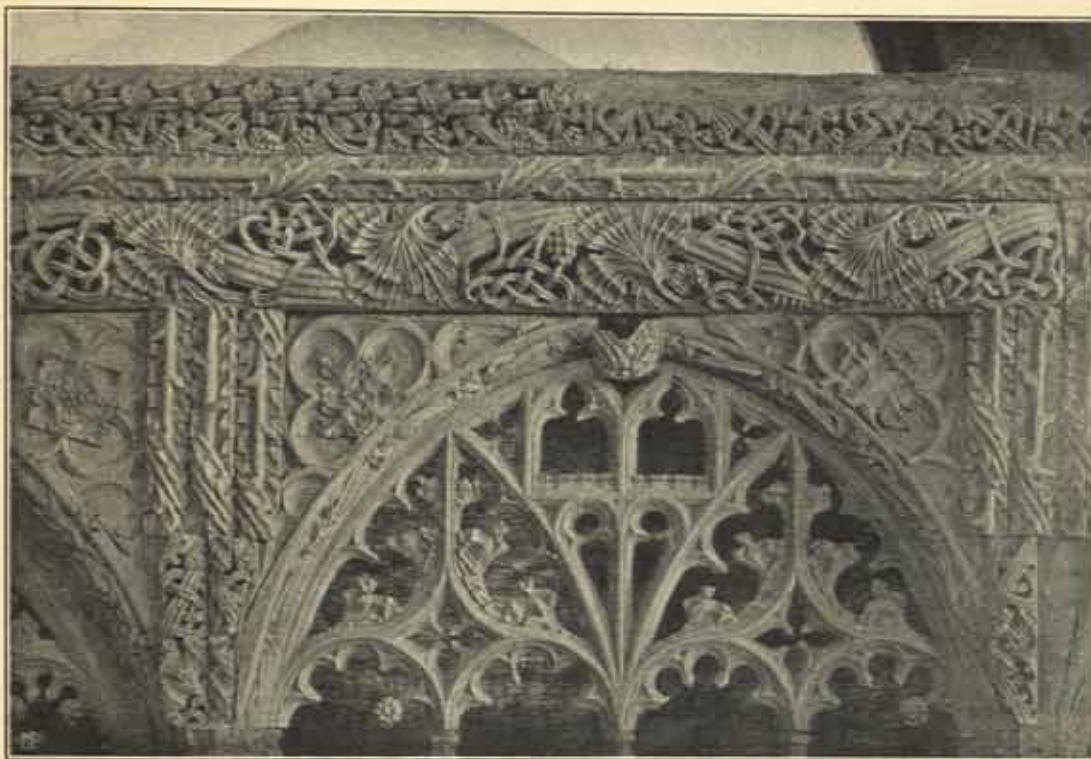
The examination in Drawing necessary to enter the Architectural Classes will be: (a) ornament shaded, from the cast; (b) a study of a plant or a flower from nature. In addition, candidates for the Joint Diploma must pass a preliminary examination in (1) Mathematics, (2) English, and (3) Latin or a modern language. The examination in subject 3 may be postponed to any date prior to a candidate's admission to the Final Examination for the Joint Diploma.

In order fully to meet the demands for higher instruction necessitated by this Joint Diploma, the authorities of the School of Art, in conjunction with the Governors of the Technical College, decided to appoint a visiting professor, and the choice has fallen upon M. Eugene Bourdon, B.A., A.D.F.G. M. Bourdon is a Bachelier-ès-Lettres of the Sorbonne, an Architect Diplômé by the French Government, and Lauréat of the Société Centrale des Architectes. From 1896 to 1900 he was Acting Inspector at the Petit Palais of the 1900 Exhibition, and with M. Ch. Girault is responsible for most of the interior decoration of that building. He has worked in New York, where he was associated with Messrs. Trowbridge and Livingston in carrying out the Astor Hotel. M. Bourdon, who speaks excellent English, commences his duties in Glasgow in October next.

As agreed at the conference at which the Joint Committee was appointed, it is recognised that the teaching of the subject of Architecture throughout must be common to both the School of Art and the Technical College, but that it will be necessarily taught somewhat differently in the two institutions, the more strictly technical side of the subject being dwelt upon in the one, and the more strictly artistic in the other.

The existing Architectural Teaching Staffs both at the School of Art and at the Technical College are to remain as they are at present constituted. Professor Gourlay, B.Sc. [A.] continues his work at the Technical College under the new arrangement, while Mr. Alexander McGibbon [A.] remains Director of Architecture at the School of Art.

It is expected that the future conduct of the newly organised School will be in the hands of a joint committee composed of representatives from the School of Art and from the Technical College.



Detail of Restored Portion of Oak Rood-screen, South Pool Church, S. Devon. Fifteenth Century.

SCREENS AND SCREEN-WORK IN THE ENGLISH CHURCH.

By F. BLIGH BOND [*F.*].

PART I.—PRE-REFORMATION.

A SPECIAL degree of interest attaches to the screens and screen-work which form such a characteristic feature of our parish churches. Beyond the well-deserved tributes of admiration which have been accorded them by students of ecclesiastical art and symbolism, on account of their beauty of design, ingenuity, and refinement of workmanship, or richness in emblematic detail, they claim a further and a deeper regard as representing a feature of liturgical use which, transcending mediæval times, derives its sanction from the Apostolic period, and its origin from a yet remoter source. And when it is realised, too, that this venerable landmark of Christian worship has never been entirely lost sight of, but has persisted in one form or another throughout the ages of the Church's history, an object respected by Protestant and Catholic alike, it may well be said that in the chancel screen we have an almost unique survival, and one well worthy to be cherished and preserved.

The object of this paper is to provide an outline of the development of the screen in its various forms, from the earliest to the latest times, and to indicate, as fully as space will permit, the several classes of screen-work met with in our churches.

The rood-screen will be principally dealt with, and chiefly with reference to the parish church. Other screens, such as those of the conventual type, have a history of their own, and cannot be fully dealt with in the limits of this essay; neither can the rood-lofts—which have also a special derivation, and as to whose form and uses much might be written—receive

more than incidental notice here. Having thus prescribed the scope and limits of this paper, a brief reference to the origin of the screen will be necessary.

The earliest churches—those of the Orient—were largely influenced by Hebrew traditions, the Jewish Temple being the model on which their internal arrangement was based. In the Temple veils separated the interior into three main divisions, allocated respectively to the people, the priesthood, and the sacred mysteries. The Christian "ecclesia" reflects this triple

arrangement, the narthex, nave, and sanctuary being partitioned off in like manner,* veils at first being employed, and later solid or constructional screen-work in addition.

The inner screen, that which divided the sanctuary from the nave, at first consisted of a row of pillars supporting a beam, from which the veils were suspended, and drawn or withdrawn according to liturgical requirements. This beam in its turn supported a row of images, and soon developed into a solid iconostasis—practically a wall, containing a central doorway and hagioscopes, which has persisted as a distinctive feature of the Greek and other Eastern churches to the present day (see illustration). The iconostasis, introduced also into Italy, seems never to have taken root there, but was gradually supplanted by the baldachino, which, in the Basilican type of church, provided the necessary means of veiling the altar. Consequently the Italian churches after the ninth century cease to exhibit anything in the nature of a solid screen to the sanctuary; and although the columnar or trabeated screen, such as we see at St. Mark's, Venice, is found, a low screen is more usual.



SCREENS IN A COPTIC CHURCH AT CAIRO.

In the foreground is the light screen dividing nave from choir, whilst in the background is seen the solid barrier before the sanctuary, with its central doorway shrouded by a curtain. On each side is a small hagioscope. Along the top of this screen are a series of painted panels forming the iconostasis.

Thus the old Jewish pattern of interior divisions was soon lost sight of in Rome, and was practically effaced in churches of her communion after the lapse of some centuries; whilst in the Eastern churches it persisted in a well-marked manner. The general form of churches was also modified in Rome, on the lines of her already existing structures, public and private; and what we term the Basilican type of church was the result.

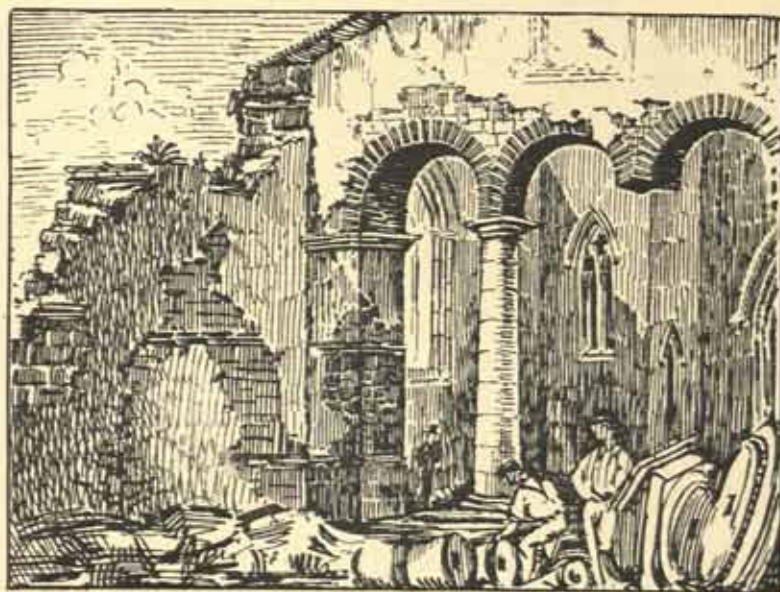
We have thus the two fountain heads of ecclesiology, Levantine and Roman; and it is to the former that we must look for the origin of our own British type of church, for Christianity was brought to these islands in Apostolic times, and a regular branch of the Church constituted here long before the "peace of the Church" enabled Rome to proselytise.

Nothing having survived in Britain of the actual structures of our Celtic ancestors, we are dependent on such information as may be gleaned from early writings on this point. It seems clear from old descriptions that there was a solid screen between nave and chancel, having doors in it, these doors being covered by veils, and the screen decorated by paintings.

* Bingham, *Antiquities of the Christian Church*, vol. II. p. 401.

Such an arrangement is implied in a history by Cogitosus of St. Bridget's Church at Kildare, and in a Gaelic MS. preserved in the Advocates' Library at Edinburgh. For the rest we must assume with Scott that they resembled the early Irish oratories in their general characteristics. But side by side with these there existed some larger churches built by artificers from among the Roman settlers on a Roman or Basilican model; and of these some fragments may yet remain incorporated with the fabric of later churches, as in the case of the Church of St. Martin at Canterbury, restored by St. Augustine, of which Bede says that it had originally been constructed by Roman believers, thus apparently suggesting a distinction between native and Roman workmanship.

But the Roman type of church never became dominant here. The British tradition was destined to survive not only the influence of the Roman settlers, and the destruction wrought by the Saxon conquest, but even the power of the great revival which took place under Augustine and his Italian missionaries. Certain features of Roman importation—notably the apse—are observable in the remains of some of the churches of the earlier Saxon period, but in a greatly modified form; and the continuity of the older traditions may be clearly traced in the prevalence of the square east end in the later examples of Saxon work and in the solid barrier or mural screen which appears to have usually divided the nave from the presbytery. This screen, in the apsidal churches, generally took the form of a triple arcade.



CHANCEL ARCADE, RECVLVER.

There stood until 1806 at Reculver an early and perfect instance of this; and before it was taken down a drawing was made, which has fortunately been preserved. A slight sketch is here given. The arches were of equal size, all having been open, so far as can be ascertained, to the floor level [see fig. 1A, diagram sheet A, p. 540]. Another instance closely approximating to the Roman model was that of Rochester, where the apse was shallow and the triple arcade may be regarded as the equivalent of the "arch of triumph" which in the Basilican churches opens the sanctuary to the nave.

But in other instances, as in that of Reculver, already noted, and St. Pancras, Canterbury [fig. 2, sheet A], and still more notably at Brixworth, the space reserved within the mural screen is much greater, and suggests that the screen with its triple arcade must rightly be viewed, not as a sanctuary screen, but a choir screen; a feature which may be presumed to have acquired increased importance in the sixth century in consequence of the orders of Pope Boniface (A.D. 533) making distinction between clergy and laity at Mass, and the forbidding of the choir to the laity by the Council of Tours (A.D. 566)—an order repeated by the Council of Nantes, A.D. 658.

There is independent corroboration of this theory in an Anglo-Saxon pontifical mentioned by Bloxam in support of his contention that a "veil or wall" was the customary division in the early church between clergy and people; and the remark of Durandus as to the use of the veil in this position as a regular adjunct of ritual, although his phrase is metaphorical, has been held to suggest that a wall was really customary at this point. In the early Basilican churches the clergy occupied seats around the apse, the altar being brought forward to a position within the chord of the apse; but from very early days a different custom seems to

FIG. 1. BRADFORD-ON-AVON.



FIG. 15. RECLIVER.

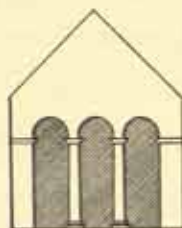


FIG. 2. ST PANCRA'S, CANTERBURY.



FIG. 3. BRIXWORTH.



FIG. 4. HAUXTON.

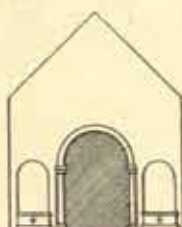


FIG. 5. BAULKING.

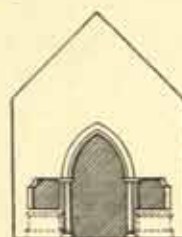


FIG. 6. FOLTIMORE.



FIG. 7. SANDRIDGE.



FIG. 8. HIGHWAY.



FIG. 9. AWLSCOMBE.



FIG. 10. PATRICIO Wood Screen.

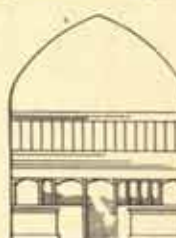


FIG. 11. RANWORTH.

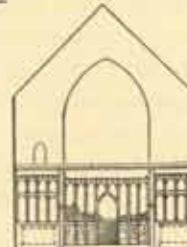


DIAGRAM SHEET A.

have ruled here, the altar being placed nearer the east wall, whilst the clergy retired to a less elevated position westward of the altar. At Brixworth [fig. 3, sheet A] there is a marked distinction between the presbyterial space, or choir, and the sanctuary itself, and there was here originally a wall between choir and nave, having in it a triple arcade, the central arch wider and loftier than the side arches, and corresponding in its proportions to the sanctuary arch beyond, whilst above each of the smaller arches was a clerestory window, opposite and similar to the small windows still existing in the east wall and flanking the sanctuary arch.*

George Gilbert Scott, in his "Essay on the History of English Church Architecture" (p. 154), mentions a fact which seems to have peculiar significance in connection with our early church plans. The 'Sarum use' which in the eleventh century superseded the older

* Rev. C. F. Watkins, *Monograph on Brixworth Church*.

British liturgy, and was designed to incorporate national features of ritual with the order of service approved by Rome, provides for two distinct orders of ministry in the church, those who serve the altar, and those whose place is in the choir. This distinction, dating apparently from far earlier times, would appear helpful in the interpretation of the plans. By the separation of the worshippers under the threefold heads of celebrant, clerks, and people the primitive idea of the tripartite division of the "ecclesia" is once more restored. This had in the earliest days the form of narthex, nave, and sanctuary, but with the disappearance of the narthex, and with it of any special division of the structure reserved for the penitents and catechumens, the old symbolism was in danger of being lost sight of, and indeed in the Roman Church this had happened, for the form of churches there had been simplified to a twofold division only, *i.e.* nave (including choir) and sanctuary.

The second and later type of Saxon church shows a reversion to British models. It exhibits the square east end, and the division between nave and chancel is strikingly emphasised, there being but a single opening of very narrow proportions in the wall separating the two parts. The most

perfect instance now surviving is the Church of St. Lawrence at Bradford-on-Avon [fig. 1, sheet A]. In the Anglo-Saxon ritual there was no elevation of the Host, but the whole act of consecration was hidden from the people by a veil over the narrow archway, just as it is in the Eastern Church by the iconostasis. But although the single narrow opening became generally adopted, and may be regarded as characteristic of our earlier mediæval churches, nevertheless

FIG. 1. RECVLVER.

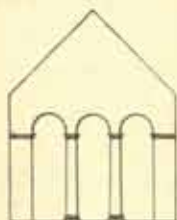


FIG. 2. CAPEL-LE-FERNE.



FIG. 3. WESTWELL.

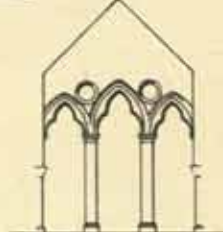


FIG. 4. BOTTISHAM.

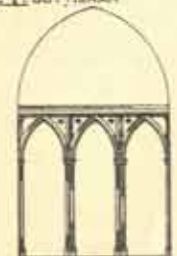


FIG. 5. STERDING.



FIG. 6. LIANGLIEU. Wood Screen.



DIAGRAM SHEET B.

the other Saxon model, the triple arcade, seems to have been regarded in some cases as a pattern worthy of imitation by the builders who came after, for we find an almost identical arrangement cropping up in churches erected subsequently to the Norman period. The reader is referred to the sheet of diagrams (B) which has been prepared to exhibit the relationship of these and later examples.

Fig. 1, sheet B, shows the original arcade at Reculver; fig. 2, that at Capel-le-Ferne, Kent, where the arcade appears to be of fourteenth-century date, and consists of three openings of equal span extending from the floor upwards. Higher up in the gable wall is another large arched opening, which would have furnished the requisite means of communication between the chancel and the loft, or "pulpitum," which would appear to have originally traversed the wall on its western side. A sketch of the wall in its present state is here given [see page 544].

Fig. 3 is a diagram of the arcade at Westwell, Kent—a remarkable and graceful instance. Here the openings are taller, and there is no trace of any original provision for a loft or gallery, although one was probably inserted later.

The triple arcade at Bottisham [fig. 4] is of later date, and partakes more of the nature



STEBBING



GREAT BARDFIELD

of a screen, inasmuch as it is not carried up solid into the chancel arch, but terminates just above the springing.

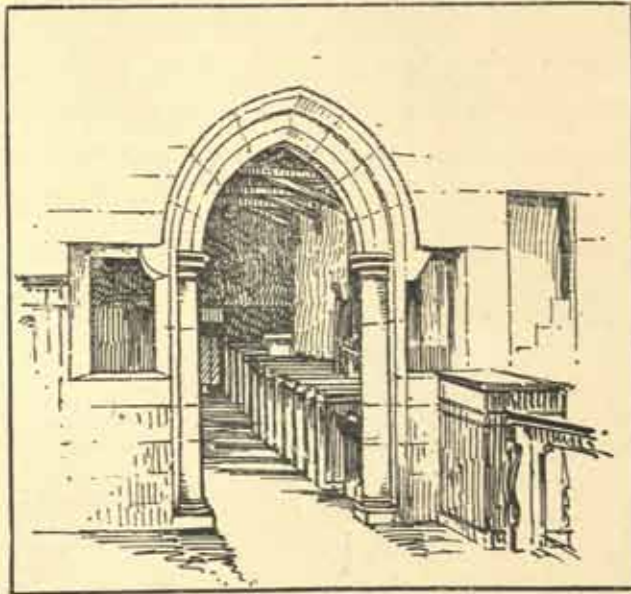
A more advanced development of the chancel arcade is to be seen at Stebbing [fig. 5a], where we find the three openings combined into one large fenestration enriched with tracery and canopy-work, and containing a special place for the Holy Rood and its attendant images, the whole having an original and beautiful effect.

And lastly there is an even more graceful and charming instance at Great Bardfield. In these two cases the principle of the mural screen is preserved in theory, but for practical purposes the chancel is so completely opened up as to satisfy all the requirements of congregational worship.

The influx of foreign ideas which took place with the advent of the Norman builders for a time profoundly influenced the type of church building in Britain. We see in the widened chancel arches a temporary weakening of the old tradition. But the latter seems soon to have reasserted itself, and in the later Norman style we find many instances of Norman arches of very modest proportions, often showing a considerable wall-space on either side. Scott says: "The tradition of a small doorway-like chancel arch continued through the Norman period on into the thirteenth century," and he states that many had altars placed on either side of the arch, the piscina in some cases remaining. At Peterchurch, Hereford, is a stone altar slab on each side of the apse; and the same at Urishay, north and south of the chancel arch. At Hauxton, Cambs, is a narrow chancel arch [fig. 4, sheet A] flanked by arched recesses, under which were side altars. These date from c. 1229. At South Shoebury, on each side of the fine Norman chancel arch, are large pointed arched recesses, before which, without doubt, altars once stood; but whether these were closed, as they now appear, or were open to the chancel is not certain.

The observation of this arrangement very naturally engenders the speculation whether the side arches in the triple Saxon arcades above mentioned may not have been furnished with side altars.

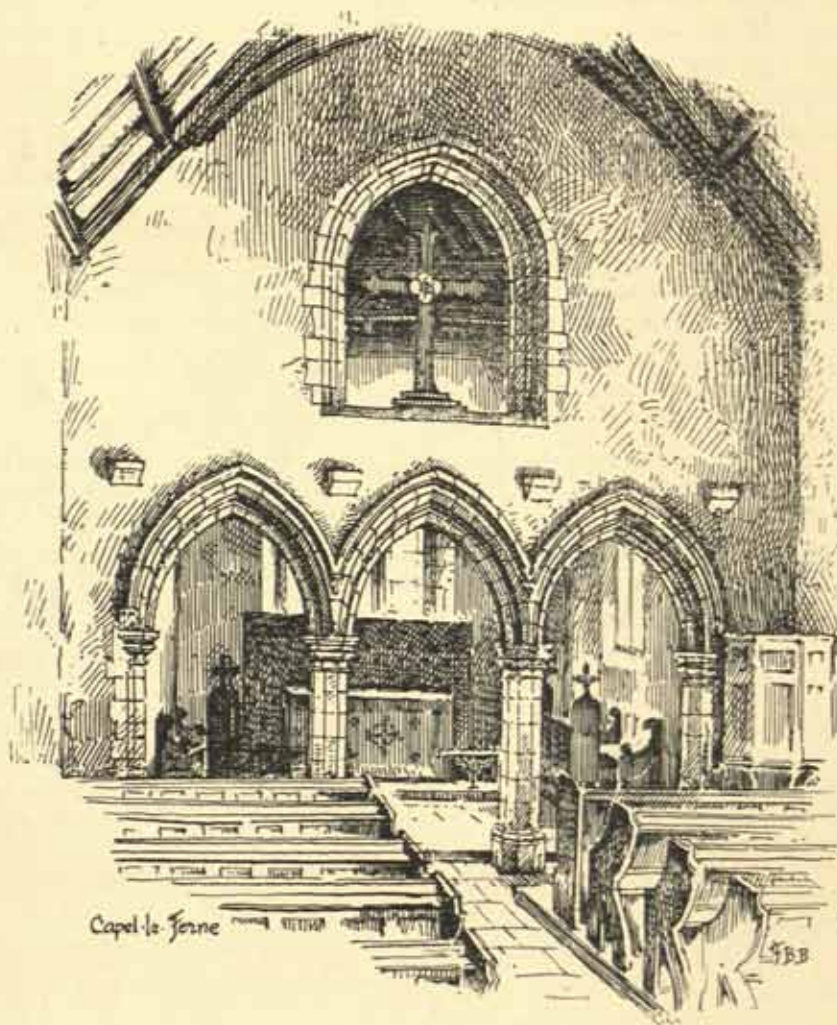
Altars of the Holy Rood are a feature of very ancient origin, and were placed at the eastward extremity of the nave. The ruins of the Church of St. Pancras show that the side openings contained a wall at least two feet high, and were perhaps of the nature of windows or hagioscopes; whilst the central arch, which was much wider, would have alone formed the gangway. From the thirteenth century onward the custom of placing altars on either side of the chancel opening seems to have been fairly established, and to have become, in the purely parochial type of church, an ordinary feature. In some of our churches there are indications of this use remaining in the shape of decorations in fresco on the walls by the side of the chancel arch. This was one of the earlier forms of altar-back. Traces of such paintings were discovered at Hauxton, and there is fresco-work in a similar position at Alveston, Gloucestershire. Occasionally they are seen on the surface of piers in the nave arcade, as at St. Albans. There can be little doubt also that the hagioscopes, which were in so many instances pierced through the chancel wall on each side of the narrow early arches, must have been connected with the same use. The hagioscope is a feature associated with the iconostasis, or Eastern form of screen, on which, as we have seen, the early British screens were modelled. There is evidence of a great revival of their use in the thirteenth and following centuries. At first we find them contrived as a makeshift by the removal of masonry on either side of the chancel arch. Of this nature is the curious instance at Baulking, here illustrated, and of which a diagram is also given [fig. 5, sheet A]. Later on they become constructional in the walling on either side of the chancel arch, and of this many instances survive. Those at Nunney, Somerset, and Poltimore, Devon [fig. 6, sheet A], are typical.



HAGIOSCOPE, BAULKING CHURCH.

The chancel arch of Norman and pre-Norman days was furnished, it is believed, by an appropriate veil or tapestry hanging, forming the third or outermost of that triple series of ritual veils of which Durandus speaks as being interposed between clergy and laity. But it appears probable that there was, in addition to this, some sort of constructional screen-work in the chancel opening itself. Wooden lattices, or "cancelli," had been in use in the Continental churches from time immemorial, and there is no reason to suppose that they were not equally well known here. We have, moreover, evidence of such in the survival of examples at least as early as the latter part of the twelfth century. The simple wooden screen-work still preserved in Rochester Cathedral is of this period, and the wooden balustrade at Compton of similar date. Such screen-work would have been considered necessary in the wider arches of the earlier Norman churches, the later tendency being all in favour of masking the opening or reducing it to smaller dimensions.

In some churches this tendency was carried still further, and we find the chancel arch positively built up solid with a wall-like screen, having a comparatively small central doorway and sidelights or hagioscopes within it. Few of these now exist, as they have proved too inconsistent with the ideas of congregational worship associated with the post-Reformation days; but at Sandridge we have a fairly perfect example [fig. 7, sheet A]. A similar wall with

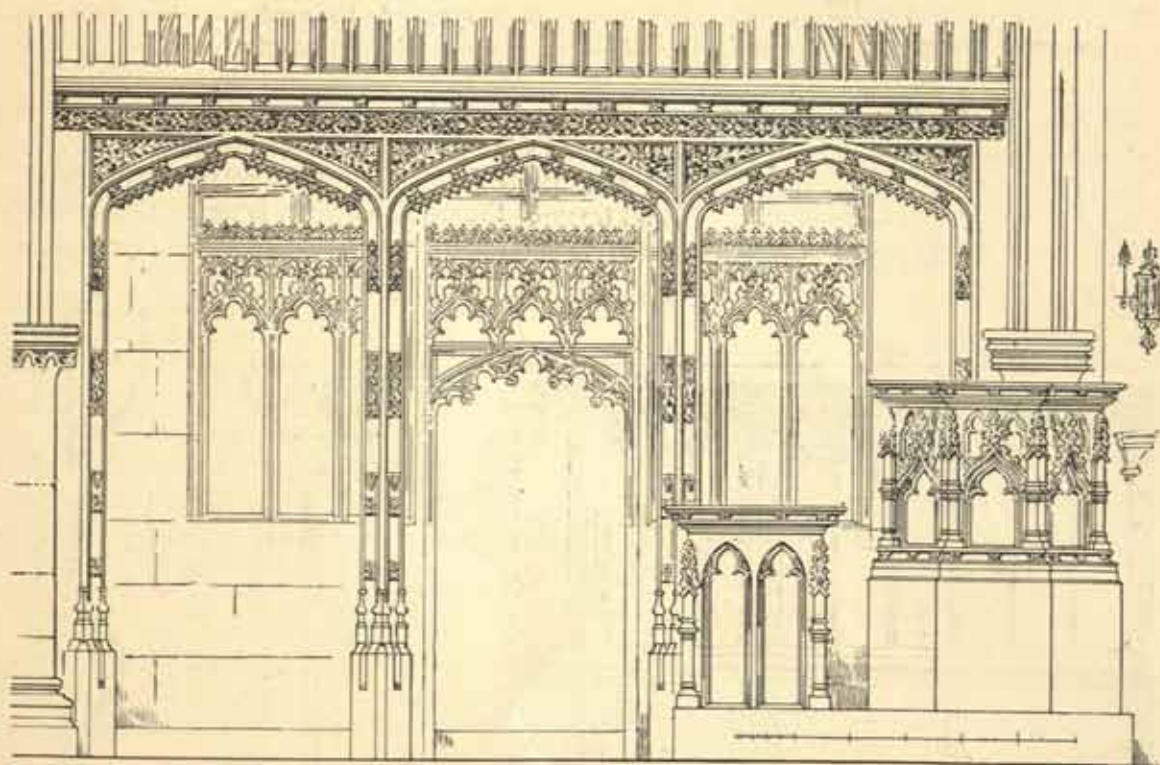


openings is mentioned as having existed at Cerne Abbas, Dorset, before the restoration, and others are spoken of.

But there is a far more numerous class of churches in which the solid barrier still exists, but in a modified form. Instead of being built to the whole height of the arch, the wall is terminated at a short distance above the doorway, and sidelights and the balance of space left open, thus forming the stone screen of familiar appearance. Yet even these screens were in all probability surmounted by a partition of lighter construction within the tympanum of the chancel arch, so that to all intents and purposes the barrier would have been complete.

Instances of these heavy stone screens in parochial churches may be seen at Highway, Wilts [fig. 8, sheet A]; Bradford Abbas, Dorset; and many other places. They would appear to have had in many cases a gallery running across their western face, forming an early type of rood-loft. There is evidence of this feature in the upper orifices which at Capel-le-Ferne, Sandridge, and elsewhere are still seen above the lower range of openings. The still earlier ones at Compton and Melton Constable may have been analogous in their nature, but in the latter case no trace of a balcony or gallery now remains.

The type of screen with traceried hagioscopes or fenestrations on either side of a central doorway appears to have arrived at its full development in the fourteenth century, and two



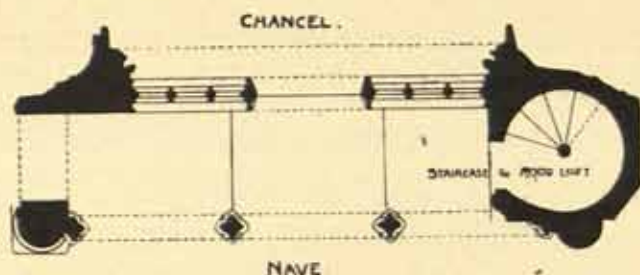
DOUBLE SCREEN, COMPTON BASSETT, WILTS.

perfect and parallel instances may be given—the one from Brittany, in the exquisite little screen of Le Folgöet, and the other from England, in the equally charming screen at Compton Bassett, of which an illustration is given above.* In the former case the side altars remain, and their relationship to the hagioscopes is obvious; but in the latter the altars have been removed. Both alike are constructed to support a rood-loft, and they may be regarded as being typical instances of the earlier type of rood-loft screen, both being double, the western face consisting of a triple arcading, and the eastern of the solid mural screen, the rood-loft spanning the intermediate space, and being supported upon a stone groining. The

* This is taken from an old lithograph published before the "restoration." The pulpit and lectern are modern. The balustrade above the cornice, part of which is indicated in the drawing, was also not original, having replaced a more ancient balcony of stone. The wooden

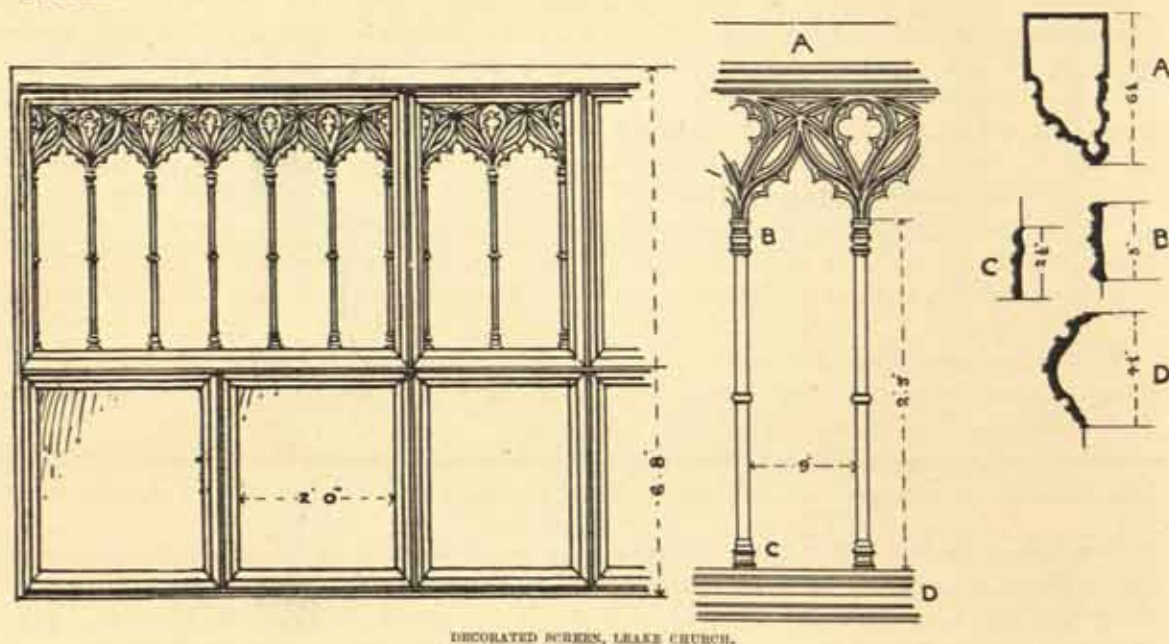
rails are now removed, and the rood-loft staircase built up by the "restorer," to whose credit, however, it may be said that the detail of the screen has been skilfully repaired, and the statuettes of the Twelve Apostles successfully replaced in their long-empty niches.

general form is analogous to the cathedral jubé, or choir screen of the fourteenth century, of which Exeter furnishes a notable instance.



COMPTON BASSETT. PLAN OF ROOD SCREEN.

There are numerous imperfect screens of the Compton Bassett type scattered over the West of England, and these, in the writer's opinion, are really nothing but the backs of what once were double screens, and all were furnished at one time with their arcade to the western side. There is one of great beauty remaining at Hilmarion, and another at Yatton Keynell, both in Wilts. The former has its turret stair within the pier on the north side, as Compton Bassett has on the south. There are some in Devon of rather later date, but apparently of the same type. That of Awliscombe [fig. 9, sheet A] retains the eastern member in a fairly perfect state. But all trace of the western arcade is swept away. The magnificent stone screen at Totnes belongs to another category—that of the groined single screens.



DECORATED SCREEN, LEAKE CHURCH.

Brief mention has already been made of the appearance of wooden screen-work coeval with the stone in the twelfth century or earlier. It appears more generally in the thirteenth century, perhaps because the ravages of time have not so completely exterminated it. At Stanton Harcourt is a wooden rood-screen of simple arcaded design, furnished with the customary central doorway. Thureaston, Kirkstead Chapel, and Old Shoreham provide other early instances; whilst at Harwell, Berks, and Wellcombe, Devon, are slightly later screens. Those at Northfleet and Leake are fine instances of Early Decorated work. But there are two very different schools of design in our ecclesiastical woodcraft.

Although the clumsiness of stone proportion gave way to a lightness more appropriate to the material, designers were loth to give up those features whose character was borrowed from stonework—namely, parapets, buttresses, weather tables and drip-moulds, pinnacles and battlements—and in some districts the ornamental parts of the design are chiefly composed of these objects dwarfed to Lilliputian proportions. This seems a good deal the case with the wood screens of the second or middle period—and much of the East Anglian work dates from that time. But in the West Country, where we have an abundance of late screens—some being immediately pre-Reformation—there is little or no borrowed or imitative detail of this sort; the features are bold and honest, well adapted to the material. Beads preponderate over hollows in the mouldings, and the enrichments all suggest wood or woody fibre and vegetative growths. There is an absence of hard square edges, which, like hollows, never look natural in wood.

In this connection it seems important to recall the fact that it is in the same districts wherein we find this more natural and real way of treating woodwork that the Church has had a continuous history from Celtic times, so that older schools of woodcraft might have been perpetuated, and the ideas and traditions of Celtic art would have lingered in the imagination of West-country men, who were largely of Celtic blood.

The British methods of church building were all based on wood rather than stone construction, and in the treatment of wood they excelled. The traditional character of their ornament is exemplified in the instance from South Pool, Devon, at the head of this paper, in which the idea of twisted tendril-work is very strongly brought out in the treatment of the cornices. There is a striking similarity between some of this detail and the interlaced tendril patterns which we find incised upon early Celtic stonework, and which seem to imply a web of plaited wicker-work as its originating character—such as we may reasonably suppose to have formed the basis of the lighter screen or partition work constructed by our Celtic ancestors, whose ornament was almost all of this type.*

But those who designed and executed the earlier wooden screens betray a want of knowledge of the material and of a sufficient familiarity with its capabilities. Their work is simply an imitation of stone, with often the same proportions given to mouldings that would be suitable in the latter material, and the work appears consequently lacking in refinement.

Sometimes the wood is undercut, after the manner of stonework. This is the case at Clapton-in-Gordano, where the work is treated in a manner suggestive of fearful labour for the unfortunate executant. With the development of the joiner's art in the fourteenth century, however, the splendid qualities of oak as a subject for fine and delicate carving became realised, and in such glorious instances as those of King's Lynn we see the full realisation of the dexterity and genius of the mediæval woodcarver.

Side by side with the development of wooden screen-work, stone screens took on a more open and graceful character, and at last began to exhibit a fatal defect, the converse of that early defect of the wooden screens, namely, an attempt to imitate the lightness of timber. But the penalty of this must soon have been painfully evident in the fragility of the tabernacle work so treated, and in the final resort oak held the field. Thus in the fifteenth century the wood screens are found to preponderate vastly over the stone ones.

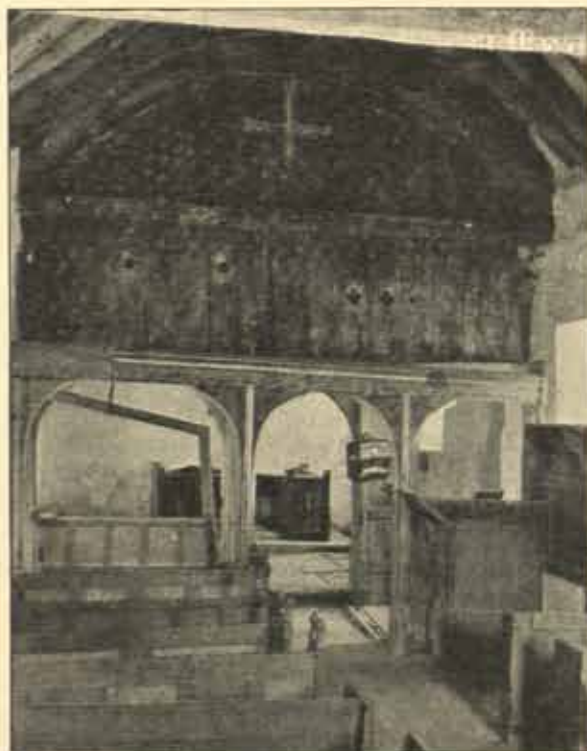
Instances have been adduced to show the earlier type of screen and rood-loft, and before passing to a later development it may be of interest to see whether the arrangement such as

* Sir James Hall entertained the theory that all Gothic art was only a kind of fossilised basketwork, and he traced the origin of crockets and foliated pinnacles to the sprouting buds of wickerwork twined for ornament's sake

upon long round poles. A valuable essay bearing on the "skeuomorphic" origin of architectural detail, by Dr. Colley March, will be found in the *Transactions of the Lancashire and Cheshire Antiquarian Society* for 1889 (vol. vii.).

we have seen at Compton Bassett can be paralleled in a wooden screen. This would seem to be the case. Hidden away in a secluded nook of the hills that border the valley of the Usk is the little Church of Llanellieu, which contains a screen of most singular character [see fig. 6, sheet B]. It is double. On the western part is the familiar triple arcade in oak, the character of the detail being decidedly early, probably fourteenth-century.

But to the east, instead of a solid partition, we find a replica of the western arcade. The interval is ceiled over with a flat soffit, forming a rood-loft. This has been despoiled of its flooring, staircase, and western balcony, but is closed in on the eastern side by a close-boarded tympanum diapered with flowers on a coloured ground of distemper, and exhibiting on its western face the rood-beam at a considerable height above the loft, with a painted rood substituted for the more ancient carved one, the socket for which may be observed in the beam.



LLANELLIEU.

The tympanum forms a complete barrier from the rood-loft upwards, but is pierced with sundry small quatrefoil and other openings which would have enabled its original occupants to view the sanctuary. The general appearance of the screen and tympanum is very remarkable, and from its early form possesses exceptional interest. The photograph here given is taken from the western side. It will be noted that the balcony front has been removed, and the western beam cut short at its southern extremity, so that the depth from front to back is not so well represented as could be desired.

The front arcade of a similar but later screen remains at Bronllys. That at Strensham, which retains its painted rood-loft, appears to be of similar type, but the back screen is gone. The stone arcade at Bottisham may perhaps be regarded as forming part of an analogous structure.

In some instances, as at Guilden Morden, the altars beneath the rood-loft were entirely enclosed by "cancelli" of light traceried screen-work. Double screens of this character are not common. Montgomery furnishes an instance, and there is another at Edington, Wilts.

The progress of wooden screen-work in later years may be outlined as follows. Next in order to those above described, and of which Llanellieu is typical, are a series of screens having the rood-loft, as at Llanellieu, with its entire projection to the westward, the screen forming the support of the floor to the east, whilst to the west a beam is provided, running clear from wall to wall, though occasionally supported by struts, where the bearing was long, as at Llanwnnog. The suggestion of an arcade disappears, however. The soffit of the loft is usually a flat coving panelled in compartments. A perfect instance of this type of screen survives at St. Margaret's, Herefordshire, and another, of very different detail, at Sheringham, Norfolk. In each case the loft is complete. The extremities of the western beam are

usually supported by carved corbels, sometimes, as at Sheringham, exhibiting grotesque monsters carved in the spandrels. The beam is generally enriched on its western face with a series of pierced hollow carved bands of the "vine-leaf" order, held in a casement moulding. The beautiful screen at Patricio [fig. 10, sheet A] is of this type, and still retains its ancient stone altars, which are mentioned as having stood also at Llangwm Isaf, in Monmouthshire. Following this comes a type of screen of which numerous examples survive. In this we find the screen no longer forming the extreme eastward support of the loft, but placed centrally below it, and there is a tendency shown to give a more decided rise to the soffit, so that the coving becomes a feature of importance. These lofts, like the foregoing, are usually wide, and some, as at Llanwnnog, are furnished with struts for intermediate support under the beams east and west of the screen. From this it is but a small step to such examples as those of Christian Malford, Wilts; Ashchurch, Gloucester; or Willand, Devon, where the coving has a considerable vertical height and is a striking feature; thence to those screens where it becomes intersected for a portion of its height by groins, as at Ranworth, Bramfield, Conway, Astbury, &c., the upper or continuous portion being divided into richly traceried panels by intersecting ribs; and finally the fully groined screens whose fan-like vaulting forms so exquisite a feature in the West-country examples.

It seems probable that this last and most beautiful development of English pre-Reformation screen-work was the natural outcome of the use of the arcaded form of tracery head within the square, as we see it in some of the earlier screens. Examples of this feature are met with in all parts of the country.

The effect of the groining as we find it in England is perhaps unsurpassed for beauty by any other form, and in no country has it been carried to anything approaching the perfection in which we find it here. The groined soffits of the Breton screens are coarse and clumsy by comparison. Some of the best examples are those in Devonshire, where the panels between the groin ribs are usually filled with sunk tracery; but occasionally, as at Hartland, Burrington, and elsewhere they are embossed with foliage, grapes, pomegranates, &c., carved in low relief, giving a rich effect; and now and then, as at Atherington, Marwood, or Poltimore, a delicate Renaissance treatment takes the place of the fruit and leaves.

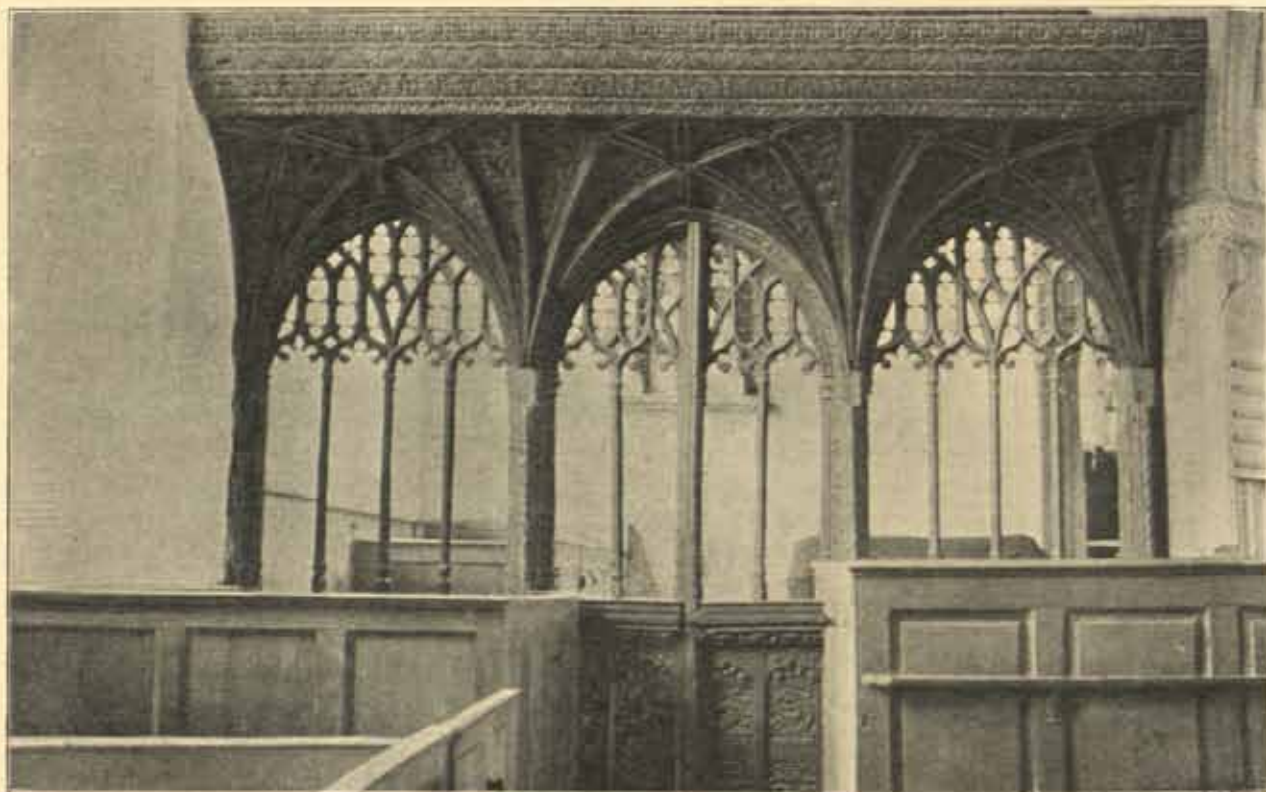
An illustration is given [p. 550] of the west side of the screen at Marwood. It was originally surmounted by a sumptuous gallery front, with carved statuettes, which disappeared within living memory.

Although Devonshire is the county richest in groined screens, the parts of Somerset adjoining can also boast of a large number. The type of detail varies in different localities, and for a description of those in Devon readers are referred to the *Transactions of the Devon Association* for 1902 and 1903—especially to the latter number—in which the writer has attempted a classification.

There is a type of singular beauty and refinement in South Somerset, exemplified in the screen at High Ham, than which it would be perhaps impossible to find any work of more exquisite refinement and graceful design in the whole West Country. Another group of beautiful screens occurs in the Dunster district, and an illustration is here given in the form of a measured drawing of the old screen of St. Andries, West Quantoxhead—which possesses some interest, inasmuch as it has been lost to sight for upwards of forty-six years, having been stowed away in the squire's lumber-room ever since the church was rebuilt. Through the courtesy of Sir Alexander Acland Hood the writer was enabled to bring it once more to the light of day and take measurements of it. His attention was first drawn to it by reading a description in an early publication of the Camden Society, "A few Words to Church Builders," in which this screen was recommended as a model for imitation. The screen is fairly complete,

though in fragments. The crestings alone are missing, and have been supplied in the drawing according to conjecture.

Cornwall appears to have possessed at one time an abundance of groined screens, but vandalism has been so horribly rampant in that county that practically only two or three remain. St. Ewe has one of the best. The work is rough, not approaching that of the Devon screens in quality. As we enter the southern and midland districts we find a marked decrease in the number of the groined screens. One reason would appear to be that the churches of the more central and southern counties were not so systematically rebuilt in the fifteenth century as were those of Somerset and Devon, and thus the older arrangements for



MARWOOD.

the most part were perpetuated. But as we approach the eastern counties we again enter into a promising field.

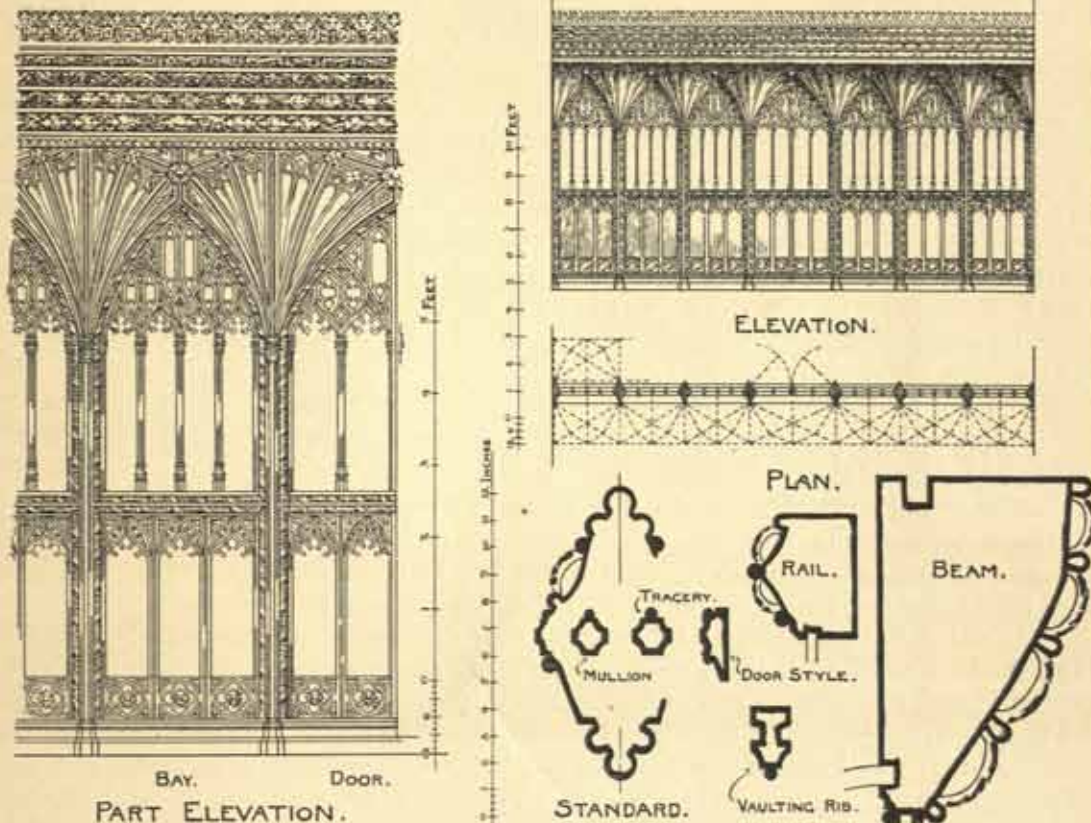
At Edlesborough, Bucks, and Redbourn, Herts, are fine groined screens, each presenting a marked peculiarity of type and of considerable merit. At Redbourn the groining is perforated, giving a very light effect, suggestive of filagree-work.

Further east we find large numbers of screens in Norfolk and Suffolk bearing evidences of having once possessed a groined coving, but of limited size, and probably of less elaborate nature than the West-country screens, the East Anglian work being earlier.

Screens of the Norfolk pattern are of entirely different character from those of Devon, and as these represent the two leading types of English screen-work a brief comparison may not be here out of place. The lights are taller and narrower than those of Devon, and are far more

open, there being in the majority of instances no tracery mullions; but the arcades are garnished with a double-feathered cusping, of minute and delicate character; whilst the heads of the openings are filled with a crocheted ogee canopy starting from a little below the springing of the arch. Devonshire screens, on the other hand, have their fenestrations subdivided generally into four sections by small mullions, which carry a closely reticulated tracery head.

ROOD SCREEN ST. AUDRIES W. SOMERSET.
FROM OLD CHURCH PULLED DOWN IN 1858.



The difference in the character of the mouldings and other small detail has already been noted, those of East Anglia being much more imitative of stonework features in attenuated form than those of the West; but they have a feature in common in the painted figures of saints, prophets, sibyls, &c., which adorn their lower panels. Yet there is the greatest possible divergence in respect of the quality of the paintings in the two districts; for whereas those of Norfolk are refined works of art, frequently of a masterly character, their effect heightened with gold and with the relief of embossed designs, those of Devon are mostly of rude and conventional design, coarse in execution, yet picturesque in their ugliness, and very valuable in their antiquarian merits and their symbolism. They have been made the subject of an

able monograph by Mr. C. E. Keyser, F.S.A. (*Archæologia*, vol. lvi.). The fact that in these later screens the series of painted panels ran the whole length of the screens seems conclusive evidence that no altars could have been attached, as in the earlier screens, to their western side. Where altars existed in the nave they must have been independent of the screens, unless the very elaborate pier casing which in some instances broke the continuity of the screens with its rich niches and canopy-work may have served as the reredos for an altar. At North Molton, at the extreme southern extremity of the rood-screen, is a semi-hexagonal projection to the westward, which would appear to have been the support of an image connected with some shrine. At Bradninch statuettes still remain on the pier casings. There would appear to have been in many cases altars upon the rood-loft itself. Records testify to this fact,* and there remain structural evidences in the piscinæ which survive in the walls of the loft: some are mentioned by Bloxam, who was of opinion that they were very common in England, not only upon the lofts, but beneath them, to the west of the chancel opening.

But the altars, which in the earlier churches appeared either against the western face of the screens or against the walls immediately north and south of them, were usually relegated in the later churches to special chantry chapels, of which we have abundant instances. The later churches were more frequently aisled than those of earlier date, and we often find that where the nave alone is aisled, as at Dennington, Cliffe Pypard, and elsewhere, the easternmost bay of each aisle is enclosed by screen-work, forming a rectangular junction with the rood-screen on its western side, and in these enclosures lie the altars.

In churches of the Devonshire type, where the aisles generally flank the chancel as well as the nave, the rood-screen runs in a continuous line from north to south, dividing off the nave on the one side from the chancel and the chantries on the other, whilst the latter are in their turn divided from the chancel by parclose screens, often of distinctive and beautiful design, the special gift of the donor of the chantry.

The arrangement at Ranworth [fig. 11, sheet A] is typical of those churches of which perhaps the majority were not aisled, but were provided with a wide nave, allowing a considerable wall space on either side of the arch. At Ranworth not only the altars remain, but their fine reredos work—a continuation of the character of the screen.

It will be convenient here briefly to summarise the types of screen-work which have been spoken of. First there is the mural screen, of which the prototype is the triple arcade of the Saxon Church; seen later again as a triple arcade, then finally as a traceried fenestration, as at Bardfield [p. 542]. Next there is the narrow chancel arch with hagioscopes and side altars, leading to (1) a wall with central door and side lights, then (2) to the stone screen with central door and side lights within a widened arch, (3) to wooden screens of similar form, and finally (4) to open screen-work across nave and aisles.

In all cases hitherto dealt with in this paper the principal opening in the screen, be it arch or door, has been in the centre, and the altars, if any, on either side.

This arrangement has principally had reference to parochial or non-monastic churches.

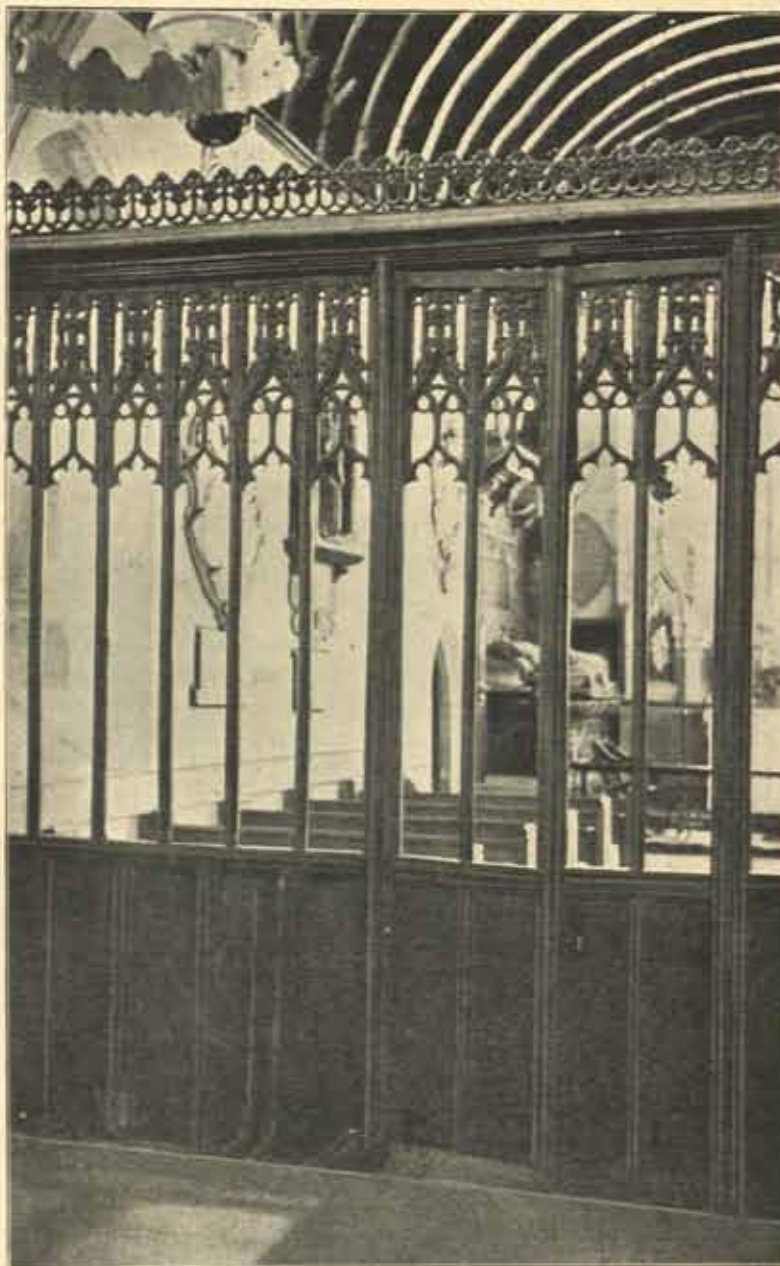
There remain yet to be considered a class of screens which are more frequently found in connection with those churches (numerous in this country) whose naves were devoted to

* For the following extract from the Lichfield records I am indebted to the Rev. R. M. Serjeantson, of Northampton:—"Bishop Scrope founded a chantry called the Chantry of Richard II., at the altar of the Holy Cross on the rood screen of Lichfield Cathedral. Bishop Burghill in 1409 changed the site of the chantry to the altar of a newly constructed chapel by Bishop Scrope's tomb near

the High Altar, because of the peril incurred by an old priest or one in bad health celebrating on the rood loft, and because the faithful who were weak and infirm could not come to the altar of the Holy Cross without bodily inconvenience" (*Lichfield Episcopal Registers*, Burghill, f. 206).

parochial use, whilst their choirs and transepts formed the chapel of a college of monks. The rood screen in these churches is of solid construction, built at the east end of the nave, and forming a complete wall of separation between the two churches. Against the centre of the screen stood the parish altar*—that of the Holy Rood—or, as it was termed, the Jesus Altar, whilst on either side was a doorway, used for processional purposes. This arrangement may be seen at St. Albans, Crowland, Ewenny Priory, Bolton Abbey, and other places. The same feature existed at Dunstable and Brecon. But occasionally, as at Dunster, the parish church is found divided from the monastic by a screen of the ordinary type with central doorway.

In addition to the rood-screens, single or double, which were an invariable feature of English churches, there were, in the larger churches at all events, secondary screens marking off the limits of choir and sanctuary, just as the rood-screen determined the limits of nave and choir. Such secondary screens have not survived so frequently as the rood-screens—few indeed are left. There is one at St. David's, another at Ewenny, whilst at Edington the sanctuary screen with its loft has survived, and the rood-screen has disappeared. This appears to be the case in the Church of Tawstock, Devon,



TAWSTOCK DEVON, SANCTUARY SCREEN

* The early introduction of this form of screen appears from a passage quoted by Bloxam, which occurs in the account given by Gervase of the destruction and repair of Canterbury Cathedral in the latter part of the twelfth

century. Gervase says: "Pulpitum vero turrem predictam" (he is speaking of the central tower) "a navi quodammodo separabat, et ex parte navis in medio sui altare Sancte Crucis habebat."

where a light and lofty screen, obviously never meant to sustain a loft, spans the arch at the east of the crossing. Such a secondary screen also existed at Dunstable, and until a few years ago at Brecon—of which an illustration has been preserved. Others are mentioned at St. Martin's, Colchester, and the Churches of Brilley and Michaelchurch in Hereford.

The sanctuary screen seems occasionally to have supported a loft, as well as the rood-screen, so that in some churches there would be two lofts. In churches of the usual parochial type, having nave and chancel, the latter would be situated about half-way down the chancel, over the "gradus chori." As to its uses it seems obvious that its primary use would have been as a support for the Lenten Veil, which was preserved as a feature in the English ritual down to the time of the Reformation, being dropped across the chancel at this



SCREEN AND ROOD-LOFT, STAVERTON CHURCH, DEVON.

point. Others have conjectured that the presence of a loft over the sanctuary screen indicates a place for images or relics. It was probably also a support for tapers, like the rood-loft.

In the case of Postling Church, Kent, there are evidences of a narrow loft having run across the sanctuary, supported on two beams, but without a screen below, whilst the rood-beam traversed the church at some distance to the westward.* The following passage is quoted from *Cutt's Dictionary of the Church of England*:—"Besides the screen, which was universally interposed between the chancel and the nave of a mediæval church, there are also some examples of a second screen between the sanctuary, or sacrarium, and the chancel"; and the following, from Fosbrooke's *British Monachism*, which mentions the "High Altar, with the pix or Host hanging under a silk tester with curtains, and with the cross and screen full of pictures or statues behind it, or a beam over it, sustaining images and relics."

* See Monograph on Postling Church, by A. D. Cheney, F.R.Hist.S. in the *Home Counties Magazine* for July 1903.

The same author makes separate mention of "the rood-loft or gallery across the nave, where were the images of the Crucifixion, Mary, and John, and sometimes of saints on either side, *and where the musicians played.*" The writer has italicised the last words, as indicating what may be regarded as the principal function of the rood-loft in the English parish church—a point upon which he must refrain from further enlarging here, as it would open up too large a question.

A propos of the tester with its silken curtains, which recalls the Roman baldachino, this is a feature which has entirely disappeared from our mediæval churches, and may be regarded as one never common in them, and not indigenous to this country. But it may be interesting to note that prior to the restoration of Goosey Church, Berks, there was an ancient tester or baldachino over the altar painted with emblems of the Passion. This unfortunately disappeared during the restoration by the late George Edmund Street many years ago.

Screens and rood-lofts were erected in ever-increasing numbers towards the close of the fifteenth and during the first three decades of the sixteenth century, and upon them was lavished all the choicest work that imagination could devise or dexterity achieve. Then came the Reformation, and the downfall of their glories; yet amid the wreck of all ecclesiastical art the screen continued to be held in estimation, and persisted as a feature of our churches. But of the vicissitudes and changes they underwent the writer will treat in a future contribution.





9, CONDUIT STREET, LONDON, W., 15th Oct. 1904.

CHRONICLE.

Plenum Ventilation and Royal Victoria Hospital, Belfast.

The following is the communication received from Mr. Bibby which was referred to in the issue of the JOURNAL of the 24th September:—

17th September 1904.

The startling allegations published in the JOURNAL of the R.I.B.A. for the 27th August, respecting my criticisms of the arrangements of the above-named hospital, demand a reply in detail:—

1. Instead of overstating the consumption of coal in the new hospital as compared with the old one, I discover that I have erred the other way, as is proved on page 48 of the Annual Report of the hospital for the year ending 31st December 1903, which shows 115½ tons as the average quarterly consumption of coal in the old hospital during the first three-quarters of the year, while the amount for the last quarter alone is there given at 716½ tons for the new hospital, and during the use of the plenum system of ventilation.

This Report gives the number of available beds as being 204, but since its publication I have been informed by the superintendent that there are only 190 available beds in the new hospital; the old hospital had 196 available beds.

It is obvious therefore that the figures I gave showing the enormous increase in the coal bill ought to have been much higher, but throughout I have avoided making assertions until I was in a position to supply proofs; any one who may be interested can ascertain, from what has been published in this Journal, that all my statements *re* the consumption of coal are fully warranted by the published reports of the hospital authorities.

2. I am charged by Messrs. Henman & Cooper and Lea & Son with the authorship of an "appreciative" article, published so late as last year in *The Local Government Journal*, on the subject of Plenum Ventilation.

There is not in the article in question a word to justify the assumption that I gave the slightest approval of the plenum system; on the contrary,

at the opening of the article I clearly premised that I only favoured systems of ventilation which depend upon the most simple and natural means possible, and what followed was chiefly a description of the plenum system; but I have written, for the Journal in question, about ninety articles, in several of which were "appreciative" remarks on natural ventilation.

3. The statement that the system of plenum ventilation in this hospital had been tried "thoroughly," both in winter and summer, is incorrect, inasmuch as the hospital had not been open for anything like a year when the Board of Management so reported; and the hospital wards are still unopened as regards one-third of the accommodation. But, in any case, it should be noted that this Board includes a large number of ladies and clergymen, with a few medical men, who are more or less responsible for permitting the introduction of the system of ventilation adopted, and, presumably, predisposed to speak as favourably as they could of that which they had consented to.

(Yet it is difficult to believe that many of those concerned are not fully aware that the plenum system of ventilation has recently been *specially prohibited by the authorities* of the great hospital to be erected in Manchester—here the architects competing were expressly forbidden to include the system as a part of their schemes!)

4. It is suggested in the letter of Messrs. Henman & Cooper and Lea & Son that the defects I pointed out *re* the ventilation of the operating-rooms of this hospital did not exist, but that the odours of chemicals possibly arose from the dresses of the nurses, &c. I can only say that when the operating-door was thrown open, I being near, there was a rush of warm air from the room to the corridor, carrying with it the smell of anaesthetics. (It is common to find the temperature of operating-rooms to be kept higher than in other parts of hospitals, hence, possibly, the failure manifested at the time of my inspection.)

5. My remarks *re* the lack of windows and pleasant outlooks will be seen to be fully justified by a reference to the JOURNAL of the R.I.B.A. for the 19th December last, where, on page 98, will be found a complete plan of the windowless walls of the wards.

6. The architects and engineers of this hospital direct attention to the relative costs of each case during the year 1902 and 1903, and give the number of cases treated during 1902 as being 2007; this is quite wrong, as may be seen on page 14 of the Annual Report for the year ending last December, where the number is correctly given as being 2,160; therefore the cost per case should have been stated as £4 6s. 10d., and not as given by Messrs. Henman & Cooper and Lea & Son at £4 13s. 6d. (The cost per bed for the old hospital in 1902 was £47 17s. 0d.; but by the

end of the following year it had increased to nearly or quite £52 per bed, and although the plenum system of ventilation had only been in use for about one quarter.)

The general arrangement of these Irish hospital reports compares unfavourably with those issued in connection with most English institutions of a similar description; but had the architects and engineers examined the annual reports of their hospital in Belfast with care, they could not have failed to detect certain inaccuracies and some contradictory statements, which appear to have misled them.

GEORGE H. BIBBY.

Postscript (received 28th September).

Since writing the above, Colonel Deane, the Superintendent of the Royal Victoria Hospital, Belfast, has informed me that the actual consumption of coal during one complete year, in the new hospital (ventilated by the plenum system), amounted to 1,742 tons; as there are, according to the same authority, 190 available beds in the hospital, the consumption of coal has reached the enormous amount of over nine tons per patient's bed. But when the whole of the 300 beds become available the rate per patient's bed would be reduced to about six tons; *providing that the same amount of coal is found to be sufficient for the full hospital as for the hospital only two thirds occupied.* This remains to be proved.

G. H. B.

[The Editor is informed by Mr. Bibby that he considers the communication which appeared in the issue of the 27th August last contains matter which is a libel upon him. The Editor did not so regard any part of the communication, or it would not have appeared in the JOURNAL; and he regrets that anything which could be understood by any one as making any imputation upon Mr. Bibby should have been published.]

School of Art Wood-carving.

The School of Art Wood-carving, South Kensington, which now occupies rooms on the top floor of the new building of the Royal School of Art Needlework in Exhibition Road, has been re-opened after the usual summer vacation, and it is intimated that some of the free studentships maintained by means of funds granted to the School by the London County Council are vacant. The day classes of the School are held from 10 to 1 and 2 to 5 on five days of the week, and from 10 to 1 on Saturdays. The evening class meets on three evenings a week and on Saturday afternoons. Forms of application for the free studentships and any further particulars relating to the School may be obtained from the manager.

Obituary.

We regret to announce the decease of the following members:—

William Henry Arber, elected *Associate* 1878, *Fellow* 1898.

Edward Baldwin John Knox, M.Inst.C.E., of Cape Town, South Africa, *Associate*, elected 1877.

James Lewis Thomas, F.S.A., F.R.G.S., *Hon. Associate*, elected 1897.

THE ARCHITECTURAL ASSOCIATION.

The Royal Architectural Museum.

Mr. E. Guy Dawber, in his Presidential Address at the new home of the Architectural Association in Tufton Street, Westminster, on the 30th ult., referred to the valuable possession the Association has in the unique collection of casts and models which passed into its custody along with the premises of the Royal Architectural Museum. In the educational work of the Association these objects will be of the utmost value, and the task of arranging them in proper chronological sequence has already been commenced under the able direction of Mr. W. G. B. Lewis. A revised catalogue of the contents of the Museum is also in contemplation. Under the new order of things the Museum will be found not only more generally helpful to the architect, but, what is perhaps even more important, it is likely to awaken the interest of the general public in architecture and be of educative value to them also.

The New Premises Fund.

The indebtedness of the Architectural Association for its new premises reached a total of £10,000. Of this amount over £5,000 has been subscribed, and a generous donor has offered a further sum of £1,000 conditionally upon the balance being raised before the end of the Session. The President of the Association appeals to the profession and to all others who are interested in the advancement of architecture for help to clear off this debt.

Control of Street Architecture.

Referring in his Address to the great building schemes which are changing the character of whole districts in London, Mr. Guy Dawber says: "The most conspicuous feature in this new architecture is its entire absence of uniformity or consideration of surroundings. Architects, with varying success, have given rein to their imaginations without allowing themselves to be controlled or influenced in any way by neighbouring buildings; so that our streets present a want of character and scale which is singularly unsuitable in a city such as this. That this should be the case where many of the

buildings individually are most admirable is lamentable, and I cannot help thinking that it is a matter for regret that in this country we have no Ministry of Fine Arts, or some consultative committee on art who could advise when sites come into the market, or buildings are pulled down, as to the form the rebuilding should take, or what improvements or modifications in the design would conduce to the future dignity and beauty of the city. It is, perhaps, too much to hope that the London County Council will control the capricious talents of architects and builders in Aldwych and Kingsway, but the greatest opportunity of recent years will be lost if such sites are allowed to be covered with individual erections—the creations of commercial syndicates, too varied in style and material to give any dignity or character to their environment. The recent changes in the Strand have proved that a great deal of the beauty of St. Mary's came from the fact that the church was so well fitted in style and size to the position in which it was built, and to the height of the houses around it. I venture to think this essential principle is not sufficiently regarded in most of the new buildings we see on all sides. This feeling of inequality and lack of proportion is more noticeable in our street architecture than in anything else: there is no settled tradition in building; no definite aim or standard in view; and all treat different things in different ways, and the loudest and most garish edifice attracts the most attention." "Without doubt all this variety, this diversity of idea and design which we see everywhere throughout the country, is attributable to our lack of architectural education in the past—we have not learned in any school, nor on any method, and hence our architecture,

like our training, is individual and haphazard, every one building what best suits his taste, just as our students study or pick up their ideas in a like manner."

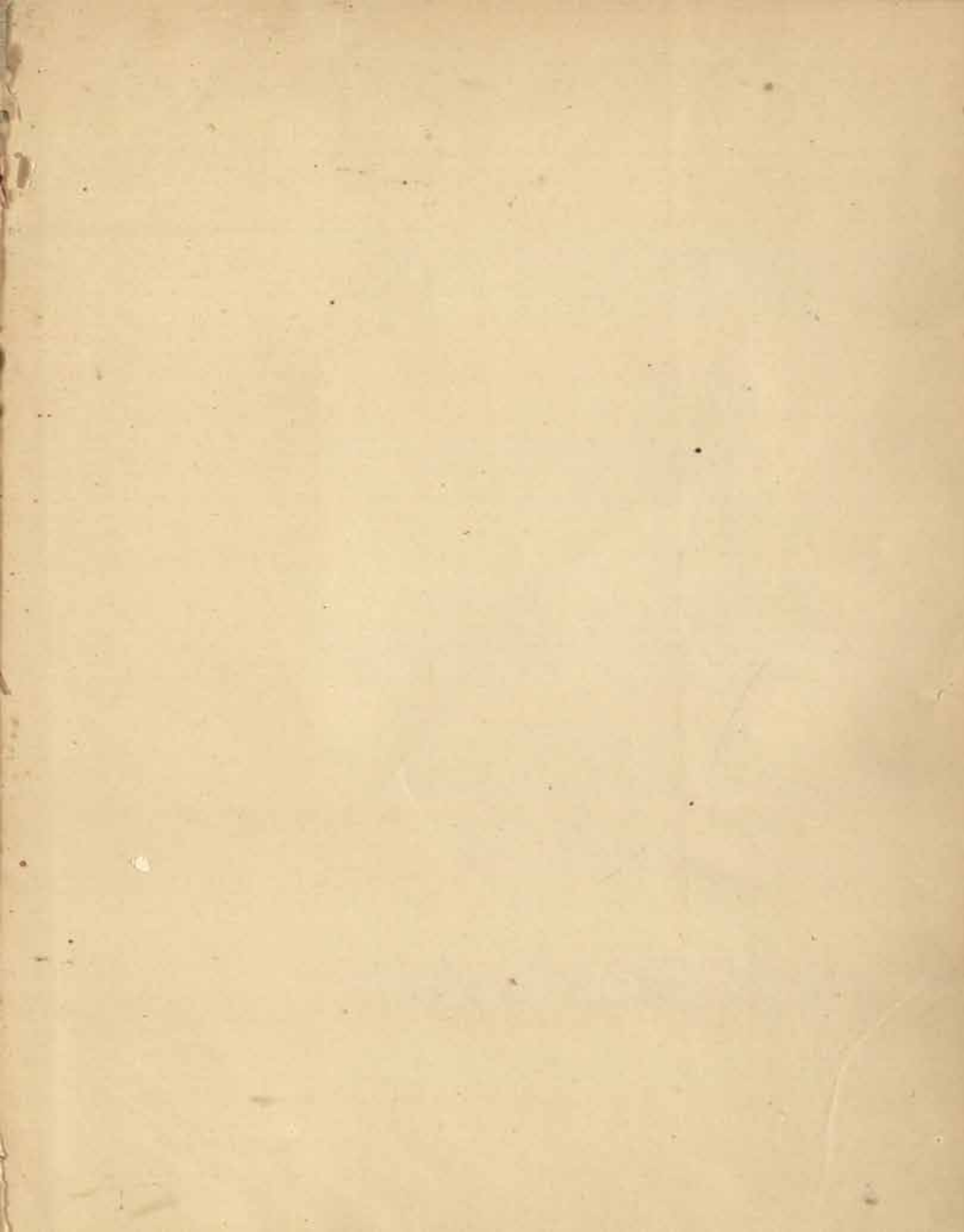
Building By-laws.

Referring to the building restrictions now enforced in nearly every part of the kingdom, Mr. Guy Dawber says:—"The public do not realise in the least the baneful and cramping effect they are producing. Buildings in cities and populous towns must of necessity be under conditions, but in country districts these restrictions should be relaxed, as the circumstances are entirely different. That the same rules framed originally for dealing with buildings in crowded cities should be applied indiscriminately all over the kingdom, and that only certain materials should be used in particular ways, not only tends to make our architecture lifeless and uninteresting, but causes the neglect and discouragement of many of the old crafts and methods of building that made our country districts so picturesque and interesting. It is now frequently only on large private estates that building can be carried on without interference, for, owing to the extended powers granted to the Urban and District Councils and the wide areas they cover, properties miles away from the nearest town or village, and in many cases entirely isolated, are now compelled to conform to these vexatious restrictions. Surely the time has come when some broad and sensible regulations should be made, and these unnecessary and mechanical by-laws modified, which are of little use in preventing jerry building, but which harass all good designers, besides adding largely to the cost."



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